USER SUPPORT APPARATUS AND SYSTEM USING AGENTS

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001]   The present invention relates to a technique for supporting Internet

users; particularly an apparatus and system for providing information employing

a virtual agent.

2. Description of the Related Art

[0002]   Since Internet access from home has become widespread, the

number of Internet Web users is growing rapidly. As it is convenient for users to

access from their home a huge body of information from all over the world, the

number of users is further increasing.

[0003]   Users know that almost all desired information exists somewhere in

the huge number of Web sites. The number of Web sites or pages, however,

has become too large for users to easily reach the information they seek

although they know that the information exists somewhere on the Web.

[0004]   Portal sites with search engines have provided more sophisticated

search methods. For example, by making information hierarchical, users can

efficiently find necessary information out of the flood of information available

using search conditions or formulas, including logical OR and logical AND in

each topic area predefined by the portal sites.

[0005]   However, it becomes somewhat difficult for average users to use

highly complicated, logical search formulas in today's environment as most of

the Web users population are unsophisticated beginners. The problem

becomes more difficult as the hierarchy of information becomes deeper, and the

5   classification of information has become too complicated to be easily

understood. The large volume of available information continues to make

utilization of the information more difficult as the number of sites is still

increasing, and more and more beginners are coming into the Web world.

[0006]   It is therefore an object of the present invention to help computer

10   users reach information they need from the Web in a friendly virtual

environment. It is another object of the present invention to provide a technique

for supporting users to smoothly conduct operations using computers and other

devices.

SUMMARY OF THE INVENTION

15   [0007]   According to one aspect of the present invention, the user support

apparatus comprises an agent storage means and an agent output unit. The

agent storage means stores data for a first agent based on user information,

and data for a second agent based upon an expert in a specific area. The

agent output unit provides data from the first and second agents either visually

20   or audibly to the user.

[0008] In this configuration, the first agent provides a selection guide to the second agent when the second agent selects information necessary for providing a service. The process of providing the guide is conducted visibly from the user.

5 **[0009]** The first agent therefore reduces user operation as it acts with the second agent. In this manner, the user is able to understand the direction of the process being performed by the second agent.

[0010] The process of providing the guide to the second agent is just for informing the user. It is therefore not necessary for the first agent to actually
10 provide the guide to the second agent inside the apparatus. System designers can easily understand it is more convenient to provide or design an agent manager to manage the first and second agents collectively rather than designing the two agents independently. In this sense, the agent manager controls the first agent and second agent as "puppets" inside the apparatus, and
15 the guide given from the first agent to the second agent is controlled by the agent manager outputting images and/or audio data to the user. Such a case is still, however, described herein as "the first agent provides a guide to the second agent".

[0011] The apparatus may further comprise an interface through which the
20 user inputs an instruction. The second agent may select information by putting higher priority on the input instruction than the guide provided by the first agent.

In this configuration, the user can modify, cancel or change the guide given by the first agent as he/she desires. The interface may comprise a user interface by which the user can input necessary instructions, and a request input unit provided by the agent manager for accepting requests from the user.

5   [0012]   According to another aspect of the present invention, the apparatus comprises a front processor that works at a user interface level, and a middle processor that handles and stores data to be presented to the user via the front processor. The front processor comprises an agent storage means that stores the data for a first agent based on user information, and data for a second agent

10   that is an expert in a specific area. The first and second agents are designed in such a manner that when the second agent requests the middle processor to provide information requested by the user, presents a selection guide to the second agent based on the user information in a manner that the user can easily understand.

15   [0013]   The front processor has a functional system to allow the user to interact with the apparatus, realized by software, hardware or any combinations of the two. In this configuration, the middle processor serves as an information accumulator and manager, and can provide information necessary for more efficient operation in general. The middle processor does not necessarily

20   assume the existence of a back processor or any other processors.

[0014]   According to still another aspect of the present invention, another embodiment of a user support system comprises a front processor that works at a user interface level, and a back processor that acquires external data to be presented to the user. The back processor includes an agent that sends the

5   external data to the agent storage. In this configuration, the first and second agents collaborate in an aforementioned manner. The back processor acquires the latest agent data and information for the user from, for example, arbitrary Web sites connected to the Internet. Here, the back processor does not necessarily assume the existence of the middle processor or any other

10   processors.

[0015]   The back processor functions as a server for serving the agent data to the front processor via the Internet or any other network. The server can be configured in various manners such that the main functions remain at the server side like CGI (Common Gateway Interface), the main functions are transferred

15   to the client side like a Java (trademark) applet or Active X (trademark), and an API (Application Program Interface) type where the main functions are provided at both the server and client sides like a Java application.

[0016]   In such a configuration, the agent storage means may store a local agent that has existed in the front processor without information or data

20   provided from the back processor, and a remote agent that has come to exist provided from the back processor. The local agent is convenient in that it is generally easily customized in each apparatus and is available even when the

apparatus is in an off-line state. The remote agent on the other hand is convenient in that it can be sent from the user to a plurality of apparatuses and is generally easily updated or registered at the server end. The local agent and remote agent may be provided to the user in such a manner that the user

5   cannot distinguish them so that a seamless environment may be provided.

[0017]   According to still another aspect of the present invention, another embodiment of a user support system comprises memory, program modules loaded in the memory and a CPU to execute the program modules. The program modules may include functions of executing a first agent and a second

10   agent, the first agent being represented as a character to bridge between the user and the system and to serve the user in a user-dependent manner based on information of the user, and the second agent being represented as a character to bridge between the user and the system and to serve the user as an expert for a specific area. In this configuration, when the second agent

15   selects information necessary to serve the user, the first agent presents a selection guide to the second agent based on the user information whereby the user can understand the presentation of the guide.

[0018]   According to still another aspect of the present invention, the apparatus comprises an agent storage that stores data of a first agent and a

20   second agent that bridge a user and the apparatus and an agent output unit that outputs the first and second agents data. The first and second agents are so designed to collaborate while having conversation or dialog recognizable from

the user when the user requests a given or arbitrary service. The conversation may show the process to optimize the service for the user. The user will be able to understand the process from the conversation.

[0019] According to any one of the aforementioned aspects, a user-friendly
5   agent can let the user know the processes conducted in the apparatus so that the user can judge whether the processes are correctly performed for him/her.

[0020] The middle processor may comprise a meta-information generator that generates meta-information by analyzing a page that is a collection of data necessary for the user and that is provided from the back processor, and a write
10   controller that stores the page and the meta-information in a local memory device by associating them. Meta-information corresponds to the information with regard to the page, with meta-data meaning "data with regard to data".

[0021] In this configuration, the page and meta-information are combined, one being embedded in the other, or the two being linked to be associated
15   together. The combination is then stored in a local memory device. The user can roughly understand or search the content or subject of the page using the meta-information. The page can be retrieved from the local memory generally faster than a global search as long as the page exists in the local memory or a cache memory.

20   [0022] The meta-information generator may further comprise a keyword detector to detect keywords in a Web page, a subject analyzer to analyze the

subject intention, purpose or theme of the page, and a meta-information extractor to extract meta-information from the page based on the theme as analyzed. The extracted meta-information is stored in the memory device associated with the page.

5　**[0023]**　The meta-information generator may further comprise a pre-check unit to judge whether the Web page is a desired page based on the detected keywords. When the page is not a desired page, the page may not be stored in the memory device. Alternatively, the page may be stored in the memory device when the page is judged to be the desired one.

10　**[0024]**　The middle processor may comprise a cache search unit. The cache search unit may judge whether the desired page already exists in the local memory device by matching the keywords with the meta-information stored in the memory device. The cache search unit may instruct to read the page from the memory device when the page is judged to exist in the memory and may

15　instruct to retry searching for the page when it is not judged to exist in the memory. A page found by the retry search may be input to the meta-information generator, and the meta-information generated may be associated with the page and stored in memory.

[0025]　The middle processor may further comprise a search pre-processor to

20　support the search conducted by the back processor by manipulating the keyword reflecting the intention of the user in a predetermined manner. The

search pre-processor may comprise a condition adding unit to add a keyword that is made objective based on the intention of the user assumed from the initial keyword reflecting the intention of the user. A search condition setting unit may set a search condition or formula including, for example, a logical OR

5   in accordance with the original keyword and the added keyword. The added condition may be reflected in the guide given from the first agent.

[0026]   The middle processor may further comprise a pre-search controller to predefine information the user may require based on the personal information of the user. In this configuration, the middle processor may instruct the back

10   processor to search, while the apparatus is not used by the user, for the assumed or anticipated information without an express instruction from the user. Pages thus acquired may be stored in the memory device together with the meta-information so that the response to the user's future request is improved.

15   [0027]   In one aspect of the present invention, the middle processor is implemented in a home server and the front processor is implemented in a device controlled by the home server. The front processor may present the operational information of the device, such as control or status information of the device, to the user and the middle processor may manipulate or improve the

20   operational information and send it to the front processor.

[0028]   In another aspect of the present invention, the back processor may be implemented in a server on a network, such as in a Web server. And the front processor may be implemented in a device, such as a PC, or a mobile terminal such as a mobile phone, that can access to the server. The front processor

5   may accept a request for indicating information from the user, and the back processor may acquire the requested information from an arbitrary information source on the network and send it to the front processor.

[0029]   According to still another aspect of the present invention, a user support system comprises an agent controller that provides an agent to support

10   a user, a request analyzer that analyzes a request input from the user, and a response controller that presents necessary information for the requested service to the agent controller when the service has been judged processible, and otherwise records the requested service as an undeciphered service. The system may further comprise a communication unit that electronically reports

15   the recorded undeciphered service to the administrator of the system.

[0030]   The request may have a specific purpose such as "Teach me how to operate a PC" or may simply be a chat request such as "Hello" to initiate a dialog with an agent. In this sense, necessary information may relate to the operation of a PC or to utterance data corresponding to each scene.

20   "Utterance" in this specification refers not only to actually spoken words but also inputted text-based requests/responses to/from the agents and the like.

[0031] There are at least two cases where the service is judged not

processible. In the first case, the request could not be analyzed or interpreted;

whereas, in the second case, information to respond to the request could not be

found even though the request itself was properly interpreted. There are at

5   least two cases where the information might not be found. In the first case, the

information could not be found inside the apparatus; whereas, in the second

case, the information could not be found even after the search was conducted

outside the apparatus. On the other hand, the service is judged processible

when the request is understood or interpreted and necessary information to

10   cope with the request exists. A series of processes to handle the request is

performed in an electronic manner and the term "understand" or "interpreted" is

not necessarily used in the sense that a human can understand the request.

[0032] There are at least two meanings of the phrase "recording the

requested service as an undeciphered service" in this specification. In the first

15   meaning, the undeciphered service is recorded with an identifier while storing all

the requests in a log file. In the second meaning, only the undeciphered service

is recorded when it is detected.

[0033] According to still another aspect of the present invention, a user

support system comprises an agent controller that provides an agent to support

20   a user, a conversation or dialog data storage means that stores conversations

held between the user and the agent, a request analyzer that analyzes a

request input by the user, a response controller that determines a response to

the request based on result of the analysis, and a log storage means that stores

the log of conversation actually held between the user and the agent. The

response controller presents to the agent controller necessary information, read

from the conversation data storage means, for the requested service when the

5   service has been judged processible and otherwise records in the log storage

means the requested service as an undeciphered service.

[0034]   A response can be made regardless of whether the service is judged

processible or not. For example, an agent can "apologize" to the user when the

service is judged not processible. In such a case, a front-end process operates

10   to apologize to the user, and a back-end process works to record the

undeciphered service so that the system may improve on conversation data,

using an algorithm for analyzing the request and the sophistication of

information search necessary for the service to become possible.

[0035]   According still another aspect of the present invention, a user support

15   system comprises a first processor that manages agent-level control and a

second processor that manages character-level control. The first processor

comprises a total system manager that enables a plurality of agents to interact

and manages the agents, and a plurality of agent controllers, each of which,

through a character, acquires and interprets a user request so as to realize

20   substantial functions of a respective agent. The second processor comprises a

character manager that provides basic functions to visually represent interaction

between a plurality of agents at the character level and a plurality of character

controllers, each of which corresponds to one of the agent controllers, and provides a series of character actions to the corresponding agent controller for use therein. Interface between a horizontal function between the plurality of agents that is provided by the total manager and the character manager and a

5   vertical or individual function provided by an agent controller and the character. controller is predetermined for the plurality of agent controllers and the plurality of character controllers.

[0036]   In the present apparatus, the total support manager and the character manager have a function that operates on a plurality of agents simultaneously.

10   These managers therefore have a horizontal function to explicitly or implicitly operate on a plurality of characters. On the other hand, the agent controller and the character controller have a vertical function that operates on a specific individual agent. The interface between the horizontal and the vertical functions is standardized, which makes it possible to add a vertical function or an agent-

15   dependent function later according to the interface. The interface allows designing new agent-dependent functions so that the agent system is easily modified and improved.

[0037]   Characters can interact, for example, appear on the same screen and talk with each other as the interface absorbs the difference of the input/output

20   formats of the characters. Conventionally, agents developed in different companies usually cannot communicate with each other. The present apparatus, however, realizes such communication by implementing agents

obeying the interface. Based on this feature, a new and improved type of agent system is provided.

[0038]   According to still another aspect of the present invention, a client-server system using a character to support a user comprises a first processor

5   that manages agent-level control and a second processor that manages character-level control. The first processor comprises a total system manager that manages a plurality of agents to achieve interaction therebetween and a plurality of agent controllers, each of which, through a character, acquires and interprets a user request so as to realize substantial functions of a respective

10   agent. The second processor comprises a character manager that represents the interaction between the plurality of agents at the character level and a plurality of character controllers, each of which corresponds to one of the agent controllers and provides a series of character actions to the corresponding agent controller for use therein. In this system, the server, collaborating with

15   the client, interprets the user requests and presents information necessary to respond to the request to the client.

[0039]   The server may further comprise a control window manager that provides functions of the total manager and the character manager to the client. The server here may be any element, component, module, unit, device and the

20   like that can provide a service to the client. The server may comprise a plurality of expert or specialized servers, each of which, for service in specific areas,

provides functions of the agent controller and the character controller to the client.

[0040]   According still another aspect of the present invention, a user support method using a character conducts agent-level control and character-level control. The agent-level control method provides a total management process to manage a plurality of agents to achieve interaction therebetween and a plurality of agent control processes, each of which responds to a user request via a respective character. The character-level control method provides a character-control process to represent the interaction between the agents at the character level and a plurality of character-control processes, each of which corresponds to one of the agent-control processes and provides a series of character actions to the corresponding agent-control process. The interface between a horizontal function among the plurality of agents and a function individual to each agent is predetermined for the plurality of characters.

[0041]   According to still another aspect of the present invention, a user support system comprises a user utterance identification block that comprises an electronic user utterance list holding assumed or anticipated utterances and identifies a user utterance when it is inputted, a plurality of response blocks, each of which makes one of the agents being designed to have a respective specific area, respond to the inputted utterance when the utterance is included in the specific area assigned to the agent. The system further comprises a

registration unit that collects in a storage region provided for each specific area a network address of a Web site according to a request from the user.

[0042]   The action of an agent may be an imitated utterance, an image, a behavior or any other activities to be performed to support the user. In this

5   sense, the action may relate to any process element or process flow. The storage region relates conceptually to a single physical entity to classify the network addresses of Web sites as bookmark information. The region, however, is not necessarily a single physically continuous area. The storage region works as a folder to classify files. A single folder may have subfolders in

10   it so that the bookmark information may be layered.

[0043]   The response block comprises a search unit that searches a Web site containing information desired by the user. The registration unit stores the network address of the searched Web site to a storage region assigned to the response block having the search unit that conducted the search.

15   [0044]   The apparatus further comprises a display unit which presents registered Web sites classified to the storage regions.

[0045]   According to still another aspect of the present invention, a user support system comprising a plurality of user support apparatuses are connected to the network as independent nodes. Each apparatus has its own

20   specific area of expertise. Each apparatus stores a respective response block while having the utterance identification block in common with other

apparatuses. The identification block is stored in one of the apparatuses. In this configuration, the apparatus containing the identification block may act as an entrance or portal server that can specify all the user utterances processible in the system. Based on the specific user utterance, a suitable apparatus may

5 be selected. The system efficiency may be improved as the system load is distributed by assigning the identification of the user utterance and the response from an agent to a plurality of nodes.

[0046] In another aspect of the system, the user-utterance collection may be provided by a library providing unit to any developers who wish to use the

10 collection. The library providing unit may transmit the collection in an off-line or on-line manner. Off-line distribution may be realized with a normal mail. For on-line distribution, a server managing the user-utterance collection may be provided. The use right of the library site is then licensed. In the user-utterance collection, a general utterance library recording general utterances of users

15 described in natural languages may be licensed. According to this license scheme, a third party can develop its own user-utterance collection and an agent-action collection independently to realize its own user support apparatus, which may eventually improve the functionality of the entire user support system.

20 [0047] According to still another aspect of the present invention, a user support system comprises a user-utterance identification block that comprises an electronic user-utterance list containing assumed or anticipated utterances

and identifies a user utterance when it is inputted and a response block that has

an electronic agent-action library to respond to the utterance and makes an

agent respond to the utterance. The system also comprises a search item

holder that acquires and holds in advance items of information the user wishes

5   to search and a search unit which conducts searches for the items. The user-

utterance identification block further comprises an additional-utterance list

containing utterances for which the search unit is planned or programmed to

start the search. The search unit starts a search when the user utterance is

detected contained in the additional-utterance list.

10   **[0048]**   The contents of the additional-utterance collection may be included in

the user-utterance collection so that the user-utterance collection may have the

contents of both the additional utterances and user utterances. In this

configuration, a user utterance can be searched in the user-utterance collection

and the additional-utterance collection simultaneously.

15   **[0049]**   The search unit may start the search spontaneously without an

instruction from the user. In this configuration, a quick response can be realized

when the user requests certain information as the search for similar information

has been conducted in the past. The searched information may be presented

to the user without a user request. The search may be performed periodically

20   or during hours when the network is not busy.

[0050] In this apparatus, each field of information may be associated with a character. The apparatus may further comprise a character display unit that presents to the user results of the search in the form of an utterance of a character that is associated with a field to which the search result is classified.

5   In this configuration, the character appears to search for the information spontaneously so that a user-friendly environment is provided.

[0051] In this apparatus, the search item holder may further comprise a bookmark holder which stores the network address of a Web site. The search unit acquires current information of the Web site. The character display unit

10   presents the current information to the user in the form of an utterance of a character when a Web site is classified to a field with which the character is associated.

[0052] The present invention has been summarized according to several aspects thereof. These aspects are, however, only examples and further

15   embodiments, combinations and enhancements are also described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0053] Fig. 1 is a block diagram of the user support apparatus according to Embodiment 1.

[0054] Fig. 2 is another block diagram of the user support apparatus

20   according to Embodiment 1.

[0055]   Fig. 3 is still another diagram of the user support apparatus according to Embodiment 1.

[0056]   Fig. 4 is still another diagram of the user support apparatus according to Embodiment 1.

5   [0057]   Fig. 5 illustrates the configuration of the apparatus shown in Fig. 1.

[0058]   Fig. 6 shows the internal structure of the agent storage in the front processor.

[0059]   Fig. 7 shows the internal structure of the agent manager in the agent storage.

10   [0060]   Fig. 8 is an information table generated as a subset of the personal information database to be referred to when a recipe is presented to the user.

[0061]   Fig. 9 is a block diagram of the meta-information generator in the middle processor.

[0062]   Fig. 10 illustrates a meta-information file generated in the middle
15   processor.

[0063]   Fig. 11 shows a collection of the meta-information file and page data.

[0064]   Fig. 12 shows the meta-information file and page data associated with each other using link information.

[0065]   Fig. 13 illustrates the structure of a search pre-processor in the middle processor.

5   [0066]   Fig. 14 is a reference table provided in the search pre-processor of the middle processor.

[0067]   Fig. 15 is a flow chart showing the process to read a target page from the cache memory or to store the page in the cache memory.

[0068]   Fig. 16 is a flow chart to acquire beforehand a page which the user

10   may need.

[0069]   Fig. 17 illustrates a screen which first appears when the user uses an agent.

[0070]   Fig. 18 illustrates a screen on which a recipe agent is called by a user-dedicated agent.

15   [0071]   Fig. 19 shows the result of the initial search by the recipe agent.

[0072]   Fig. 20 shows the result of the secondary search by the recipe agent.

[0073]   Fig. 21 is a flow chart for a service to be performed when the user issues a request.

[0074]   Fig. 22 illustrates the configuration of an apparatus according to Embodiment 2.

5   [0075]   Fig. 23 is a flow chart showing the process to initiate an agent in Embodiment 2.

[0076]   Fig. 24 illustrates the interaction between the user and the agent in Embodiment 2.

[0077]   Fig. 25 illustrates the interaction between the user and the agent in
10   Embodiment 2.

[0078]   Fig. 26 illustrates the interaction between the user and the agent in Embodiment 2.

[0079]   Fig. 27 illustrates the interaction between the user and the agent in Embodiment 2.

15   [0080]   Fig. 28 illustrates the interaction between the user and the agent in Embodiment 2.

[0081] Fig. 29 illustrates the interaction between the user and the agent in Embodiment 2.

[0082] Fig. 30 is the internal block diagram of the log storage.

[0083] Fig. 31 shows an undeciphered user request list.

5 **[0084]** Fig. 32 shows the configuration of a client-server system according to Embodiment 3.

[0085] Fig. 33 shows the structure of a control window management site according to Embodiment 3.

[0086] Fig. 34 shows the structure of a chat server according to

10 Embodiment 3.

[0087] Fig. 35 shows the structure of an index file contained in the chat server.

[0088] Fig. 36 shows the structure of an assumed utterance collection contained in the chat server.

15 **[0089]** Fig. 37 shows the structure of an access information file contained in the chat server.

[0090] Fig. 38 shows the structure of an action file contained in the chat server.

[0091] Fig. 39 shows the structure of a user terminal which is a client machine.

5 **[0092]** Fig. 40 illustrates a chat agent which appears when the user terminal is initiated.

[0093] Fig. 41 illustrates a recipe agent which appears together with the chat agent when the user asks about recipe.

[0094] Fig. 42 illustrates the dialog held between the chat agent and the

10 recipe agent.

[0095] Fig. 43 illustrates a scene where the recipe agent presents the search result to the user.

[0096] Fig. 44 shows a scene where a third agent or a travel agent appears to respond to the user.

15 **[0097]** Fig. 45 shows the entire structure of a network system including a user support system according to Embodiment 4.

[0098] Fig. 46 shows the structure of an originating server included in the user support system.

[0099] Fig. 47 shows the structure of the user-utterance collection contained in the originating server.

5 **[0100]** Fig. 48 shows the structure of an access information file contained in the originating server.

[0101] Fig. 49 shows the structure of a bookmark file contained in the originating server.

[0102] Fig. 50 shows the structure of a gourmet server contained in the user 10 support system.

[0103] Fig. 51 shows the structure of a user terminal used in the user support system.

[0104] Fig. 52 illustrates a local agent which appears when the user terminal is initiated.

15 **[0105]** Fig. 53 illustrates a chat agent which appears when the user speaks.

[0106] Fig. 54 illustrates a gourmet agent which appears when the user asks a question regarding a Peking ravioli restaurant.

[0107] Fig. 55 illustrates a screen where the gourmet agent presents the search result to the user.

[0108] Fig. 56 illustrates a screen where a registered bookmark information is presented to the user.

5 **[0109]** Fig. 57 shows the internal structure of the originating server.

[0110] Fig. 58 shows the internal structure of an additional index file.

[0111] Fig. 59 shows the internal structure of an additional-utterance collection.

[0112] Fig. 60 shows the internal structure of the gourmet server.

10 **[0113]** Fig. 61 shows the internal structure of the favorite data.

[0114] Fig. 62 shows the structure of a page stored in the agent action library.

[0115] Fig. 63 shows the screen displayed based on the page.

[0116] Fig. 64 shows the screen in which the favorite register accepts the registration of a bookmark from the user.

[0117] Fig. 65 shows the screen in which a favorite character registered by the user is displayed.

[0118] Fig. 66 shows the screen in which Gourmet Agent presents the search result.

5 ## DETAILED DESCRIPTION OF THE INVENTION

[0119] The invention will now be described based on the preferred embodiments, which do not intend to limit the scope of the present invention, but exemplify the invention. All of the features and combinations described in the embodiments are not necessarily essential to the invention.

10 Embodiment 1

[0120] A user support apparatus according to Embodiment 1 supports a user employing two types of agents. The first agent (a user-dedicated agent) provides services to a user on a user-friendly one-to-one relationship. The second agent (an expert agent) has its own specific area of expertise, such as 15 information search and so on, responsive to a user's request.

[0121] The user-dedicated agent generally has more opportunities to interface with a user and accumulates personal information specific to of the user; such as purchase records, preferred foodstuffs, hobbies, health condition and so on. The user-dedicated agent presents a guide to the expert agent for a 20 particular user when the expert agent acts for that user.

[0122] When a user, for example, requests the movie expert agent to recommend new arrivals, the user-dedicated agent, knowing the user's preference as horror and romantic comedy, may display on the screen, "Let us know very horrible ones" or "Try to find romantic and funny ones". Then the

5 expert agent may respond, "Trust me. Wait for a moment."

[0123] From the conversation between the agents, the user can understand the search process is conducted properly. The more precisely the user-dedicated agent can convey the feeling of the user, the more the user feels comfortable with the user-dedicated agent. The user may feel a degree of

10 intimacy with the user-dedicated agent similar to a virtual pet. The more comfortable the user feels with the user-dedicated agent, the easier the user-dedicated agent can collect the personal information of the user as a general tendency. The image or appearance of the user-dedicated agent may be selected or designed by the user.

15 **[0124]** The purpose of the present embodiment is almost achieved if the conversation between the agents is funny. In conventional search methods, for example, "Now searching. Please wait for a moment" or the like may be displayed but the user is not saved. According to the present embodiment, the agents can give a relaxation to the user, while the user is waiting for the search

20 result, by playing a comic chat. The agents are shown in Figs. 6 to 8 and 17 and will be described in further detail later in this specification.

[0125] Figs. 1 through 4 illustrate various types of user support apparatuses according to the present embodiment. In any case, the apparatus comprises various combinations of a front processor 12, a middle processor 14 and a back processor 20, which are the three major processing units. The front

5 processor 12 interacts with the user. The middle processor 14 supports the front processor 12 and acquires and stores necessary information in the format the user needs. The back processor 20 collects necessary information from the Internet and provides it to the middle processor 14. The back processor 20 also provides expert agents as described herein to more efficiently support the front

10 processor 12.

[0126] In Fig. 1, the user support apparatus comprises the front processor 12 and the middle processor 14 implemented on a personal computer (PC) 10. The apparatus may include the back processor 20. It should be noted that the degree of freedom to combine the processors is high. The middle processor 14

15 communicates with the back processor 20 implemented as a Web server 18 via the Internet 16.

[0127] In Fig. 2, the front processor 12 is implemented in a home electric appliance 30 and the middle processor 14 is implemented in a home server 32. The middle processor 14 communicates with the back processor 20,

20 implemented as a Web server 18, via the Internet 16. The home appliance 30 may be an audiovisual appliance; such as a digital television set, a VCR or a digital camera. The home appliance 30 may also be a traditional appliance,

such as a refrigerator or washer, or may be any other electrical appliance, including a home security appliance having sensors. The home appliance 30 is managed by the home server 32. The front processor 12, for example, manages information displayed on a LCD panel provided on a refrigerator,

5   obtains a user's instruction with regard to the refrigerator and informs the user of the condition of the refrigerator. The middle processor 14, on the other hand, may display "today's recipe" and other information that is beyond the normal operational information of the refrigerator.

[0128]   In Fig. 3, the front processor 12 is implemented in a mobile

10   terminal 40, such as a cellular phone, and the middle processor 14 and the back processor 20 are both implemented in the Web server 18, where the mobile terminal 40 and the Web server 18 communicate via the Internet 16. In this configuration, the middle processor 14 is also implemented in the Web server 18 and the mobile terminal 40 is comparably easily realized in a small

15   body of the terminal.

[0129]   In Fig. 4, the configuration is almost the same as Fig. 3, but only the back processor 20 is implemented in the Web server 18. The middle processor 14 is omitted to provide a simplified service.

[0130]   Fig. 5 is a block diagram of the user support apparatus according to

20   the configuration shown in Fig. 1. The PC 10 may be a normal computer and comprises a CPU, memory and program modules to support users loaded on

the memory. The blocks in Fig. 5 depict functions characteristic of the present

embodiment and those skilled in the art understand the functional blocks can be

embodied as hardware only, software only or any combination of the two.

[0131] As shown in Fig. 5, the front processor 12 and the middle

5   processor 14 are implemented in the PC 10. The back processor 20 is

implemented in the Web server 18. The PC 10 and the Web server 18

communicate via an electronic, such as the Internet network.

[0132] The front processor 12 has a user interface or UI 100 allowing the

user to input instructions and to conduct any other user-related matters. The

10   UI 100 may comprise input devices such as a keyboard and a mouse, a display

device such as a computer monitor to display information to the user, and

graphical user interface (GUI) applications and other programs.

[0133] An agent storage device 104 stores object data describing agents to

support system users. The object data may be hereinafter simply referred to as

15   "the data" or "the agent data". An agent output unit 102 outputs the agents to

the user via the UI 100, including both the user-dedicated and expert agents.

[0134] The user-dedicated agent is provided by an agent providing unit 134

for each user in order to obtain personal information, which is used for

customizing services conducted by the expert agent. The user-dedicated agent

20   has a function to chat with the user to acquire the personal information. The

function is activated when the user-dedicated agent is frequently used by the

user. For example, the user-dedicated agent is switched to a "friend" internally when the number of contacts between the user and the user-dedicated agent reaches a predetermined value.

[0135] The second type of agents are experts for various specific areas; such

5   as cooking, movies, travel, PCs, new products and shopping. The expert agents conduct information searches and provide requested information to the user.

[0136] From a different criterion, the agents may be classified to local agents and remote agents. The local agents are originally held by the front

10 processor 12 in a local environment and provide guidance information concerning the PC 10 to the user. The local agents may be created using the functions of the operating system of the PC 10, with the functions of application programs implemented in the PC 10, or with other functions. The local agents and the remote agents may be designed in such a manner that the user cannot

15 distinguish them.

[0137] The remote agents are provided by the agent providing unit 134. They may remain in the agent storage 104 after being downloaded, or may be deleted from the agent storage 104 after the session between the PC 10 and the Web server 18 is finished. The user may select whether the remote agents

20 should remain or should be deleted. Here, the remote agents are mainly

described although the user-dedicated agents and the expert agents may be local.

[0138] An agent processor 106 conducts necessary processes when the user issues an instruction to any one of the agents via the UI 100. The agent

5   storage 104 and the agent output unit 102 work as a mechanism to output the agent to be displayed to the user, and the agent processor 106 works as a mechanism to input user instructions to the agent and to send the instructions to the middle processor 14.

[0139] When the user asks an expert agent to provide information, the agent

10   inquires the necessary information to the middle processor 14 reflecting a guide given from the user-dedicated agent. The middle processor 14 reads necessary information from a cache memory 120, if present, and sends it to the expert agent. If the necessary information is not stored in the memory 120, the middle processor 14 instructs the back processor 20 to acquire the necessary

15   information from an arbitrary site on the Internet 16 and to send it to the middle processor 14. Information thus obtained via the Internet 16 is hereinafter referred to as a "page" after the file format of HTML. The middle processor 14 modifies the page sent from the back processor 20 to store in the cache memory 120 for future use, while also providing it to the user.

20   **[0140]** A search unit 130 of the back processor 20 searches for the page requested by the middle processor 14 via a communication unit 132. The

search unit 130 may be a meta-search engine which can conduct searches simultaneously using multiple search engines existing outside the apparatus. In that case, the search process is generally more efficient and reasonable.

[0141]   An agent controller 140 of the agent providing unit 134 generates and
5   manages remote agents and provides them as object data to the front processor 12. The object data includes image data, chat data and other attribute data to provide characters to the remote agents. When the user gives a task to an agent in the front processor 12, the task is processed by the agent controller 140 and necessary action, such as a search, is fulfilled.

10   [0142]   A user information database 150 stores the personal information of the user obtained through questionnaires, chats with agents and other routes in order to provide information fit to the user preferences and to more efficiently customize the functions of the user-dedicated agents.

[0143]   Fig. 6 illustrates the object data developed inside the agent
15   storage 104. An agent manager 500 manages expert agents 504 including the user-dedicated agent 502 and a recipe agent 506. The user-dedicated agent 502 is a "chat agent" whose main function is to chat with the user. Now the recipe agent 506 is described as an expert agent. The agent manager 500 controls the actions and conversation of the agents by selecting appropriate
20   dialog data from a dialog data storage 508, and by sending the data to the agent.

[0144] Fig. 7 illustrates the internal structure of the agent manager 500. A request input unit 510 acquires a user request via the UI 100. The acquired request 518 is sent to a keyword extractor 108, which extracts keywords in a manner to be described later in the specification.

5 **[0145]** The extracted keyword 522 is sent back to a guide presenting unit 512 of the agent manager 500. The unit 512 obtains user information from a personal information database 118 and generates a guide 524 which is passed from the user-dedicated agent 502 to the recipe agent 506.

[0146] The generated guide 524 is sent to a search pre-processor 110 and a

10 dialog processor 514. The search pre-processor 110 sets a search condition or formula taking the guide 524 into consideration. The dialog processor 514 extracts from a dialog data storage 508, based on the guide 524, conversation data which the user-dedicated agent 502 utters and other conversation data which the recipe agent 506 utters to respond to the user-dedicated agent 502.

15 The extracted conversation data is sent to the user-dedicated agent 502 and recipe agent 506, respectively. The agents utter the conversation data.

[0147] The user may enhance, modify or reject the guide 524 and input another instruction when the user-dedicated agent 502 shows the guide 524 to the expert agent in a manner recognizable by the user, for example, by

20 displaying on a screen or by voice. The instruction from the user is also processed by the request input unit 510 and is transmitted to the guide

presenting unit 512 indicating that the instruction, hereinafter referred to as a

priority instruction 520, has higher priority than the guide 524. The guide

presenting unit 512 generates another guide 524 in accordance with the priority

instruction 520 and transmits it to the search pre-processor 110 and the dialog

5   processor 514. In this manner, the service by the agents is controlled by the

user.

[0148]   An agent introduction unit 516 functions to make the user-dedicated

agent 502 introduce expert agents, such as the recipe agent 506, to the user.

This function is initiated when the user-dedicated agent 502 calls an expert

10   agent suitable for the request of the user. The dialog processor 514 retrieves

conversation data from the dialog data storage 508 necessary to introduce the

expert agent. The retrieved data is transmitted to the user-dedicated agent 502.

The user-dedicated agent 502 introduces the functions and roles of each expert

agent 504 to the user.

15   [0149]   Fig. 8 illustrates an example subset 118a which might be extracted

from the personal information database 118 to recommend a recipe to the user

under the collaboration of the user-dedicated agent 502 and the recipe

agent 506. The subset 118a comprises a preference column 530, a column of

recent meals 532, a health condition column 534, a column indicating the user's

20   least favorite foodstuff 536, a budget 'A' column indicating the acceptable

budget for ordinary meals 538 and a budget 'B' column indicating the

acceptable budget for special meals 540. As shown in Fig. 8, the user likes

Chinese food. The user recently had Chinese (C), Chinese, Japanese (J), Chinese, Italian (I), Japanese, Japanese ... as his/her meal. The health condition of the user is generally good but the blood pressure is a little high. The user dislikes shellfish and onion. The budget A is 800 yen and the

5   budget B is 2000 yen.

[0150]   In this circumstance, when the user inputs a request "Recommend a recipe", the request is received by the request input unit 510 although the user believes that the request is accepted by the user-dedicated agent 502. The keyword extractor 108 extracts keywords such as "recipe", "recommend", which

10   are returned to the guide presenting unit 512. The guide presenting unit 512 generates a guide 524 such as "not salty," referring to the health condition described in the subset 118a. The guide 524 is transmitted to the search pre-processor 110 to be included with keywords, described later, to limit the number of candidates to recommend.

15   [0151]   The guide 524 is also transmitted to the dialog processor 514. The user-dedicated agent 502, under the control of the dialog processor 514, talks to the recipe agent 506 to indicate "Don't choose salty ones". By this time, the search pre-processor 110, knowing the guide 524, has prepared the actual search, which is executed by the search unit 130. The user-dedicated

20   agent 502 shows the process to the user by the conversation with the recipe agent 506. The response of the recipe agent 506 may be simply "Wait for a

moment". The response may be prepared such that it is independent of the guide 524 given by the user-dedicated agent 502.

[0152] The guide presenting unit 512 may detect, referring to the history column 532, that the user has recently had many Chinese meals and may cause the user-dedicated agent 502 to utter "Don't recommend Chinese food", "Recommend Japanese or Italian food". In the same manner, the guide presenting unit 512 may cause the user-dedicated agent 502 to utter, referring to the least favorite foodstuff column 536, "Avoid shellfish " and "Below 800 yen" referring to the budget A column 538.

[0153] The guide 524 from the guide presenting unit 512 may be considered when the search pre-processor 110 generates a search condition. Otherwise, the guide 524 may be introduced when the search result by the search unit 130 has too many hits, or when the search result contains too many pieces of information the user did not request. The guide presenting unit 512 may therefore issue the guide 524 at various different times based on checking the search process or result.

[0154] The guide presenting unit 512 may, for example, make the user-dedicated agent 502 utter "You recommended the same recipe yesterday", "Don't exceed the budget", "Avoid onion" when the search result is revealed without giving the guide 524. In a background process, the guide presenting unit 512 may generate the guide 524 in the form of keywords, such as "budget

below 800 yen", "NOT onion" to exclude "onion" in the search, and sends the guide 524 to the search pre-processor 110. Receiving the guide 524, the search pre-processor 110 creates a new search condition and sends it to the search unit 130, which retries the search to find recipe information more

5   suitable for the user.

[0155]   The guide presenting unit 512 may generate many guides 524, referring to the subset 118a, to limit the candidates when the search result includes too many information items. The guide presenting unit 512 may indicate to the user "We found too many items. Do you have any specific

10   preference?" to acquire more keywords when the search results in too many items even after the injection of many guides 524.

[0156]   The user, on the other hand, may input "I like Chinese food" when the user-dedicated agent 502 says "Don't recommend Chinese food" to the recipe agent 506. The interjection of the user is handled as a priority instruction 520

15   and is provided to the guide presenting unit 512, which would initiate a search for a Chinese recipe.

[0157]   The user-dedicated agent 502 may ask questions of the user when the request inputted from the user is unclear. For example, the user-dedicated agent 502 might first ask "Which food do you prefer 1.Chinese 2.Japanese

20   3.Italian...?". The user-dedicated agent 502 might then ask "Which foodstuff do

you like 1.pork 2.meat 3.chiken 4.fish 5.vegetable ...?" when the user indicates "1.Chinese" to the first question.

[0158] The search by the recipe agent 506, which is in reality conducted by referring to the preference column 530, may take some time. The user-
5 dedicated agent 502 may have conversations with the recipe agent 506 to create a relaxing environment for to the user. The user-dedicated agent 502 may start a conversation with the recipe agent 506 when the duration of the search exceeds a predetermined value. The duration may be measured by a timer, which is provided in the user-dedicated agent 502 or in any other part of
10 the apparatus. The user-dedicated agent 502 (simply referred to as "502" in the following conversation) may complain to the recipe agent 506 (simply referred to as "506") for the user as follows.

(502) "Are you still searching! Are you really a professional?"

(506) "It's you who should help me if you have time to complain."

15 (502) "You always say 'Don't touch my job. I'm a professional.' Was it a lie?"

(506) "I don't tell a lie except to my wife. That's why we can live happily."

(502) "It is persuasive."

20 **[0159]** Many dialog templates can be prepared beforehand as scenes where the agents may attempt to create a relaxing environment for the user are limited to a few cases.

[0160]   In Fig. 5, the front processor 12 may provide agent services to the user with the help of the back processor 20. In that sense, the middle processor 14 is not indispensable for the collaboration of the front processor 12 and the back processor 20. The middle processor 14, however, plays an

5   important role to more efficiently support the user by managing pages requested by the front processor 12. The middle processor 14 is now described.

[0161]   An agent processor 106 receives a request inputted via the recipe agent 506. The request generally takes the form of a natural sentence, such as

10   "Let me know a good recipe for meat". The user naturally may input the request with independent keywords from the beginning. It is assumed here that the user inputs a request with a natural language sentence.

[0162]   The keyword extractor 108, receiving the request, decomposes it to minimum units or words and extracts keywords, such as "meat", "food" and

15   "recipe", to reflect the intention of the user. The obtained keywords are hereinafter referred to as "initial keywords" to be distinguished from keywords given by the search pre-processor 110 described later.

[0163]   The initial keywords are transmitted to the search pre-processor 110. The search pre-processor 110 deletes unnecessary keywords and generates

20   more objective and suitable keywords, hereinafter referred to as "objective keywords", as the initial keywords may not necessarily be determined as the

most suitable for the search. Keywords not deleted, hereinafter referred to as "selected initial keywords", are then logically ANDed or multiplied with the generated objective keywords. The result of the AND operation is then logically ANDed with the guide 524, endowed by the guide presenting unit 512 of the

5   agent manager 500, and the final result is transmitted to the search unit 130 of the back processor 20 as a search condition in the form of a formula.

[0164]   The search unit 130 conducts a search over Web sites and pages using the search condition via the communication unit 132, and matching information items, hereinafter referred to as "target pages," are obtained and

10   sent to the agent controller 140 or directly to the agent processor 106.

[0165]   The target pages are also sent to a meta-information generator 116, which generates necessary meta-information and stores the information with the target pages in the cache memory 120. The information stored in the cache memory 120 is then available for the user's future searches. The cache

15   memory 120 may be a disk type, semiconductor type and any other type of computer memory.

[0166]   The initial keywords extracted by the keyword extractor 108 are also sent to a cache search unit 112. The cache search unit 112 searches the cache memory 120 using keywords, such as "meat," and selects a desired page

20   stored therein while instructing the search pre-processor 110 or the search unit 130 to stop the global search to the Internet. The page thus obtained is

displayed to the user via the recipe agent 506. When the desired page does

not exist in the cache memory 120, the global search through the search pre-

processor 110 and/or the search unit 130 is executed.

[0167]   The personal information database 118 stores various information

5   regarding the user, including eternal information, such as preferences of meals

and hobbies, and temporal information, such as recent meals of the user. The

personal information is generally acquired through the agent processor 106

while the user is interacting with the user-dedicated agent 502. In another

embodiment, the apparatus may comprise a schedule management function as

10   a PIM or personal information manager, a health management function to

calculate the calories of meals and an accounting function to record the prices

of goods the user purchased. The personal information may be obtained

through such functions.

[0168]   A preliminary search controller 114 specifies information which the

15   user may be interested in based on the personal information stored in the

personal information database 118, and sends keywords concerning the

specified information to the search pre-processor 110. The search pre-

processor 110, triggered by the keywords sent from the preliminary search

controller 114, generates the objective keywords and the search condition by

20   which the search unit 130 starts the search. The search process initiated by the

preliminary search controller 114 may be preferably handled in a background

manner, for example, during nighttime when the user does not use the

apparatus or during the daytime when the user does not input any instructions

for a predetermined period. The process may be conducted when a mail

program, not shown, establishes the connection with the Internet to download

new e-mails. As long as the search process is handled in a background

5   manner, the meta-information generator 116 will have sufficient time for the

processing.

[0169]   Fig. 9 shows the internal structure of the meta-information

generator 116. The target page sent from the search unit 130 is inputted to a

keyword detector 350. The detector 350 detects keywords from the target

10   page, analyzing the sentences and phrases contained in the target page. The

detected keywords, hereinafter referred to as "keywords for checking", are

transmitted to a pre-check unit 352.

[0170]   The pre-check unit 352 judges whether the target page is really a

page the user desires based on the data stored in a check data storage 362.

15   The check data storage 362 stores frequent or important keywords for each

segmented subject. Similar to a portal site, the subject may be first roughly

classified into "news", "computer", "travel", "gourmet", "auction", "money",

"sports", "entertainment", "music" and "job". The "gourmet" may be subdivided

as "restaurants", "events", "pro's recipe" "ethnic dish", "cooking programs",

20   "nutrition" and "special information". The check data storage 362 obtains

keywords by, for example, checking the pages of the sites registered in the

portal site according to each subdivided subject.

[0171]   The pre-check unit 352 judges whether each of the checking keywords belongs to the above-mentioned subjects or subdivided subjects by matching the keywords for checking and keywords stored in the check data storage 362. The target page is judged to meet the user's purpose when many keywords for

5   checking belong to the subject "gourmet" and the initial keywords "meat", "dish" and "recipe," which reflect the user's intention, belong to the same subject "gourmet". Instead of the subject "gourmet", a subdivided subject, such as "pro's recipe," may be used. In that case, the target page may be judged to be appropriate when, for example, 20% of the keyword for checking belong to

10   "pro's recipe". The major function of the pre-check unit 352 is not to conduct a rigid check, but to delete pages which are apparently away from the user's intention. In this sense, the judgment may be relaxed. The process result is sent to a meta-information write controller 360.

[0172]   A subject analyzer 354, which is similar to the pre-check unit 352,

15   acquires the keywords for checking from the keyword detector 350. The subject analyzer 354, however, does process the initial keywords, but rather specifies a subject or a subdivided subject to which most of the keywords for checking belong. For example, when "pro's recipe" is specified, the subject analyzer 354 would determine that the theme of the target page is "dish", especially "recipe",

20   which is conveyed to a meta-information extractor 356 and a meta-information presumption unit 358.

[0173]   The meta-information extractor 356 searches information concerning "recipe" in the target page and generates a file which is a collection of meta-data, hereinafter referred to as "meta-information file". Fig. 10 illustrates an example of the meta-information file 370. This file contains a template

5   comprising items, such as "classification" and "name of dish", in which necessary information pieces detected in the target page are embedded.

[0174]   The meta-information presumption unit 358 presumes meta-information for the items in the meta-information file 370 for which suitable information has not been detected in the target page. For example, when

10   "calories" in Fig. 10 is left unfilled, the presumption unit 358 may calculate the calories roughly referring to the items "material", "list of stuff" and "component". The equation to calculate the calories may be recorded in the presumption unit 358 together with the template. Besides the template for cooking, a template for travel may be provided with the items "travel time", "travel fees" and

15   "the sights to see". Meta-information may be picked up from digital maps, train schedules, travel guides of the area and so on which have been investigated beforehand when the information in the template for traveling is not found in the target page. When the user is interested in traveling, the preliminary search controller 114 may obtain information to presume meta-information using maps

20   and other various information available on the Internet. The pages containing the above-mentioned map information and so on may be stored in the cache memory 120 beforehand for future use by the user.

[0175] The meta-information file 370 generated by the meta-information

extractor 356 and reinforced by the meta-information presumption unit 358 is

sent to the meta-information write controller 360. The controller 360, after the

approval by the pre-check unit 352, stores the meta-information file 370 and the

5   target page together in the cache memory 120.

[0176] Fig. 11 illustrates the association of the meta-information file 370 and

a page data 372 of the target page. The content of the meta-information

file 370 is embedded in the header or any other portion of the page data 372.

The meta-information file 370 and the page data 372 may be combined in a text

10   file written in XML (Extensible Markup Language) as follows.

<recipe meta-information>

<URL>www.recipe.com</URL>

<classification>Chinese</classification>

</recipe meta-information>.

15   **[0177]** Fig. 12 illustrates another combination of the meta-information file 370

and the page data 372. The meta-information file 370 and the page data 372

are generated independently and a link information 374 is recorded. In this

configuration, the cache search unit 112 conducts a search on the meta-

information file 370 and desired data is read from the cache memory 120

20   referring to the link information 374.

[0178]   Fig. 13 illustrates the internal structure of the search

pre-processor 110. The initial keywords extracted by the keyword extractor 108

are sent to a condition relaxing unit 400. The condition relaxing unit 400

determines which words will be deleted, referring to a reference table 404. The

5   reference table 404 records keywords which are too strict or which reduce the

number of hits too drastically. Such words can be identified based on the past

search record. Such deleted keywords are hereinafter referred to as "invalid

keywords". The condition relaxing unit 400 sends the remaining keywords or

selected initial keywords to a condition adding unit 402 and a search formula

10   setting unit 406. The condition adding unit 402 is informed of the invalid

keywords.

[0179]   The condition adding unit 402 identifies the objective keywords by

referring to the reference table 404 using the selected initial keywords and/or

the invalid keywords and sends the objective keywords to the search formula

15   setting unit 406. The selected initial keywords are logically ANDed with the

objective keywords and the result is then logically ANDed with the guide 524

sent from the guide presenting unit 512 in the search formula setting unit 406 to

obtain the search condition which is sent to the search unit 130.

[0180]   Fig. 14 illustrates the internal data of the reference table 404. The

20   reference table 404 comprises a keyword column 440, a deletion column 442

and an objective keyword column 444. The keyword column 440 records the

initial keywords. The deletion column 442 shows the invalid keywords with a

flag bit being "1". The selected keywords are shown with the flag being "0". The objective keyword column 444 shows objective keywords corresponding to the initial keywords which are identified from the past search history or by an operator.

5   **[0181]**   Fig. 15 shows the process flow of the middle processor 14. The user first inputs a search request, such as "Let me know a recipefor on meat," to the recipe agent 506. The request is acquired by the agent processor 106 (S10) and the initial keywords "meat", "dish" and "recipe" are extracted (S12). The initial keywords extracted are sent to the cache search unit 112, which conducts

10   searches over the cache memory 120 (S14) and reads the desired page when it is found in cache (S14Y). The page is read and displayed (S16).

[0182]   When the desired page is not cached (S14N), the search pre-processor 110 conducts the preprocess (S18) by identifying the invalid keywords, endowing the objective keywords and setting the search condition

15   reflecting the guide 524 sent from the guide presenting unit 512. The search unit 130 searches pages on the Internet (S20).

[0183]   The page found by the search or the target page is displayed as if it were found by the recipe agent 506 obeying the guide 524 from the user-dedicated agent 502 (S22). The target page is sent to the meta-information

20   generator 116, which conducts the pre-check, the analysis of the subject, the extraction and presumption of the meta-information. The meta-information is

then generated as a file shown in Fig. 10 (S24). The meta-information is associated with the target page in the manner shown in Figs. 11 or 12 and is stored in the cache memory 120 (S26).

[0184]   According to the process flow shown in Fig. 15, information necessary

5   to the user is generally promptly provided based on a search request which is input by the user and which may be subjective to some degree while the search process is being shown to the user. The desired page can be appropriately searched when it is in the cache memory 120 as the meta-information is added and cached. It is more probable, according to the present embodiment, that the

10   page read from the cache memory 120 meets the user's intention. Caching efficiency is generally high as the meta-information generator 116 pre-checks data to be cached.

[0185]   Fig. 16 illustrates the flow of the pre-search conducted by the preliminary search controller 114 as a background process. The user records

15   his/her daily meals in the history column 532. By referring to the personal information, it can be determined that the user likes Chinese food (S30). The preliminary search controller 114 expects an inquiry from the user concerning the Chinese recipe when it determines that the user has not had Chinese food for one week, and generates keywords such as "Chinese", "dish" and "recipe"

20   (S32).

[0186]   The preliminary search controller 114 determines the timing for the

background search has arrived when it becomes midnight or the like (S34Y)

and sends the generated keywords to the search pre-processor 110. The

process shifts to Fig. 15 via the route "A". According to this embodiment, the

5   apparatus can be a highly customized agent machine to quickly respond to the

user.

[0187]   The front processor 12, the middle processor 14 and the back

processor 20 have been described. Now the services provided by the user-

dedicated agent 502 and the recipe agent 506 will be described.

10   [0188]   Fig. 17 illustrates the initial screen 600 on the PC 10 displayed for

accessing the agent service. The user-dedicated agent 502 appears on the

screen 600 as an illustrated character, for example, and says, "Hello, let's

chat!". The user may input an instruction via spoken command. In Fig. 17,

however, an input region 602 appears on the screen 600. The user inputs, for

15   example, "Recommend a recipe" in the input region 602. The request is

obtained by the request input unit 510 and is processed in the aforementioned

manner.

[0189]   A new scene is created by the agent introduction unit 516 where the

user-dedicated agent 502 introduces the recipe agent 506 to the user. Fig. 18

20   shows one preferred embodiment of the display scene. The user-dedicated

agent 502 says "OK, I call Recipe Agent". The recipe agent 506 appears and

says "Trust me". The user-dedicated agent 502 then utters a guide 524 special to the user referring to the acquired request 518. In this example, the user is suffering from anemia and the user-dedicated agent 502 says "Recommend a recipe good for anemia".

5   **[0190]**   Continuing the above example, Fig. 19 illustrates the screen 600 when the recipe agent 506 gets the search result based on the guide 524. The recipe agent 506 says "I found" and several titles of the recommended recipes are displayed in a search result region 604 as "today's recipes". The user-dedicated agent 502, detecting that the user has had Chinese food

10   consecutively, gives a new guide 524 saying "Avoid Chinese recipes today". By this time, the middle processor 14 or the back processor 20 may have started a background process for the search avoiding Chinese food. In this case, however, the user inputs in the input region 602 "I prefer Chinese".

[0191]   Fig. 20 illustrates the screen 600 after the secondary search based on

15   the guide 524 is finished. The instruction entered by the user has higher priority than the guide 524 from the user-dedicated agent 502 and the search is limited to Chinese food. In this secondary search, the condition regarding the anemia and other conditions may be reflected. After the secondary search, the recipe agent 506 says "Here is a Chinese recommendation". The recommendation is

20   displayed in the search result region 604. The user-dedicated agent 502 says "Click here for more information". The user can click the titles of the recipes to directly access the related sites.

[0192]   In this example, the user requests a Chinese recipe even after he/she has had Chinese dishes consecutively recently. After a series of search processes are finished, the user-dedicated agent 502 may ask the user "You have had Chinese food for three days. Are you really OK?". If the user

5   answers "Yes", the search condition concerning the frequency of the same kind of food may be relaxed for the user.

[0193]   Fig. 21 illustrates the flow of the service provided by the agents. The user initiates the initial screen shown in Fig. 17 (S50). When the user inputs a request for service in the input area 602 via a keyboard or voice recognition

10   system (S52Y), the user-dedicated agent 502 calls and introduces an expert agent suitable for the service (S54). The expert agent conducts the initial search based on the request (S56) and displays the search result. The guide 524 is included in the search (S58) and the secondary search is initiated (S60) to more properly find suitable information, which is then displayed to the

15   user. The user can input an instruction at any time during the above steps to modify the service. The guide 524 may be included when the initial search (S56) is started to conduct the secondary search (S60) from the beginning. If there are still too many hits in the secondary search, a new guide 524 may be input, or the user-dedicated agent 502 may ask more questions to the user to

20   finally obtain the necessary information.

[0194]   The number of times the user initiates the agent screen may be recorded in the user information database 150 of the back processor 20. The

user-dedicated agent 502 is programmed to passively listen to the user's

request until the number of uses reaches a predetermined value. The user-

dedicated agent 502 may ask questions more actively concerning personal

information of the user after the number of uses reaches the predetermined

5   value on the assumption that the user may allow such questions. The user-

dedicated agent 502 may, for example, ask "Where do you like to go?", "How

old are you?" and the like, and the answers to the questions may be stored in

the user information database 150 of the back processor 20 or the personal

information database 118 of the middle processor 14.

10   [0195]   Although Embodiment 1 has been explained with examples, it should

be understood that many variations and substitutions may be made by those

skilled in the art within the spirit and the scope of the present embodiment. A

few such variations are now described.

[0196]   The apparatus according Embodiment 1 may be provided with

15   functions for amusement. For example, the user can be awarded points when

he/she makes access to the user-dedicated agent 502 or other expert agents.

The managing entity of the Web server 18 may award a prize to the user when

the point total reaches a certain value so that the user is encouraged to use the

Web site, which may have residual value in terms of advertisement.

[0197] "A premium agent" or a special expert agent may be secretly implemented in the apparatus to encourage the user to find the premium agent for amusement or for an award given by the site manager.

[0198] Expert agents may be local agents. A frequently asked questions
5 (FAQ) expert agent or a mail expert agent may be implemented in the apparatus to help the user operate the apparatus. Local agents are advantageous in that they can work in an off-line environment.

[0199] Each expert agent may have a function to record dialogs held with each user in the user information database 150 and a function to classify the
10 user it is now serving as a specific user type referring to the dialog recorded in the user information database 150. Expert agents are able to more efficiently respond to the user after the user is classified as a specific user type.

[0200] In another embodiment, the user-dedicated agent 502 may record user requests in the user information database 150 and the back processor 20
15 may search other users who have similar preferences, behavior, lifestyles and the like with the present user based on past requests stored in the user information database 150. The search unit 130 may push the same page to the meta-information generator 116 of such users.

Embodiment 2

20 **[0201]**

[0202] The present embodiment will provide agents which can flexibly respond to various requests from the users. Fig. 22 is a block diagram of a user support system 1010 according to the present embodiment. The entire configuration can be realized as a stand-alone apparatus. In another

5 embodiment, a back-end server may comprise arbitrary portions of the apparatus, such as an agent controller 1012, a request analyzer 1014, a response controller 1016, a dialog data storage 1018, a log storage 1020, a search unit 1024 and an agent data storage 1034. When the server is provided which supports several of these functional blocks, the remaining functional

10 blocks are implemented in the user apparatus which is a client machine. It should be noted that there are many variations on how to assign the functional blocks between the server and the client. Now, the user support system 1010 is described with the assumption that it has all the functional blocks shown in Fig. 1 so that it may operate as a basic agent machine even in an off-line

15 environment.

[0203]

[0204]

[0205] The agent controller 1012 comprises an agent output unit 1030 to display agents to a user and a request input unit 1032 to obtain the requests given from the user to the agents. An agent data storage 1034 holds image

20 data to display agents.

[0206] The request analyzer 1014 performs voice recognition on the requests uttered by the user and transforms the voice input into the corresponding sentence. The request analyzer 1014 then divides the sentence into independent words. For example, when the user utters "Good morning", the

5   request analyzer 1014 divides the sentence into "Good" and "morning".

[0207] The words thus obtained are sent to a response controller 1016, which determines the response of an agent referencing the keywords "Good" and "morning" to a dialog data storage 1018. The dialog data storage 1018 stores conversation data the agent uttered for each major keyword. The response

10   controller 1016, for example, selects "Good morning. How are you?" as the response from the dialog data storage 1018 to answer the user's greeting. The response is sent to an agent output unit 1030, which conveys "Good morning. How are you?" either by action, by voice of the agent or by a written statement.

[0208] When the user makes a request, such as "Tell me the weather

15   tomorrow," it becomes necessary to search for specific information. The response controller 1016 transfers the keywords, such as "tomorrow" and "weather," to a search unit 1024, which acquires weather forecast information via the Internet 1040. At the same time, a fixed sentence "It will be ... tomorrow" is read from the dialog data storage 1018, which is sent to the agent

20   output unit 1030 together with the information obtained via the Internet 1040. The agent output unit 1030 may respond, for example, by stating "It will be cloudy tomorrow".

[0209] The response controller 1016 will not always understand the user request. The response controller 1016 may not be able to find suitable conversation data in the dialog data storage 1018 when the user speaks or enters in an unexpected request. In such a case, the response controller 1016

5 records the request as an undeciphered user request in a log storage 1020 and reads a formatted apology, such as "I'm sorry, I cannot understand well," from the dialog data storage 1018 to send to the agent output unit 1030 as an error handling process. The agent output unit 1030 transmits the apology to the user. The minimum information the log storage 1020 should record is the

10 undeciphered user request. In Figs. 9 and 10 described later, all the interaction between the user and the apparatus is recorded in the log storage 1020 as the history of the interaction is sometimes useful in reality.

[0210] A communication unit 1022 reads the undeciphered user requests from the log storage 1020 and sends them periodically to a system manager,

15 not shown, via the Internet via electric mail when an undeciphered user request occurs or when the number of the undeciphered user requests reaches a predetermined value. The system manager may reside within the same site as the user support system 1010. The system manager registers each undeciphered user request and its corresponding response to the dialog data

20 storage 1018 to thereby improve the function or performance of the agents.

[0211] Fig. 23 illustrates the flow of service performed by an agent in the user support system 1010. When the user support system 1010 is powered on, the

agent output unit 1030 outputs an agent to the user (S1010). The request input unit 1032 waits for a user request (S1012). When a user request is received (S1012Y), the request analyzer 1014 parses the request into words (S1014). The words are transmitted to the response controller 1016, which decides

5   whether the service is possible or not (S1016). The service is determined to be possible when a suitable conversation data is found in the dialog data storage 1018 (S1016Y). Necessary information for the service is acquired from the dialog data storage 1018 and, if necessary, by the search unit 1024 (S1018). The service is performed via the agent output unit 1030 (S1020).

10   **[0212]**   Alternatively, when the response controller 1016 determines the service not to be possible or when it cannot understand the user's request (S1016Y), it reads a formatted apology from the dialog data storage 1018 to make the agent output unit 1030 utter the apology (S1022) and records the request as an undeciphered user request to the log storage 1020 (S1024). The

15   communication unit 1022 transmits the undeciphered user requests to the system manager (S1026).

[0213]   Figs. 24 to 29 show an example of the interaction between a user and an agent. In Fig. 24, an Electricity Agent 1062, which is in charge of services regarding electricity related matters, appears on the screen 1060 and accepts

20   user questions as to electric appliances. The user inputs a request, such as a question in an input area 1064. The user inputs "Something's wrong with my mobile phone".

[0214] The Electricity Agent 1062 answers "OK, tell me concretely," as shown in Fig. 25. The user inputs "Battery is not charged". The first checkpoint for this problem is read from the dialog data storage 1018 and the Electricity Agent 1062 asks "Is the battery pack correctly attached?," as shown in Fig. 26.

5 The user answers "Yes" to this question. Then the next checkpoint is confirmed. In this example, therefore, the function of the Electricity Agent 1062 is an embodiment of so-called FAQ for electric appliances.

[0215] Fig. 27 shows the response of the Electricity Agent 1062 when it could not understand the request. In this case, the user wants to know if his/her

10 electric devices can operate in Africa before the trip and asks "Let me know the standard voltage in Africa". The Electricity Agent 1062 is, however, not designed to cope with such a question and cannot find a suitable answer in the dialog data storage 1018. The user request is recorded as an undeciphered user request in the log storage 1020. The Electricity Agent 1062 answers "... I

15 am very sorry! Please contact our staff at 03-xxxx-xxxx" to hand over the question to a human operator. The system manager, viewing the undeciphered user request, can subsequently include the voltage information for each country in the dialog data storage 1018 to thereby continuously improve the FAQ.

[0216] Fig. 28 shows a scene for information search. The Cooking

20 Agent 1066 (for providing information regarding cooking, especially recipes, to the user) appears on the screen. The user inputs a request "Recommend a Chinese recipe". The Cooking Agent 1066 searches for recommendations

through the search unit 1024 and displays the recommended items in a search

result area 1068. The user can click the items displayed in the area 1068 to

acquire more information via the Internet 1040. In this situation, if the user

inputs a question, such as "Let me know a typical recipe in ancient Rome", the

5   request will probably be recorded as an undeciphered user request. The

system manager can review the information regarding recipes from various

views and can improve the content of the dialog data storage 1018.

[0217]   Fig. 30 shows the internal structure of the log storage 1020. The log

storage 1020 records all the conversation sessions 1080 between the user and

10   an agent. In Fig. 30, conversation sessions 1080 for "userABC" and "userDEF"

are shown. When the user support system 1010 is a stand-alone type, it can

create a history of multiple users by admitting login of the users. When the log

storage 1020 is implemented in the back end Web server, it can record a history

of multiple users and multiple user support systems 1010.

15   [0218]   The conversation sessions 1080 further comprises a dialog record

column 1090 and an undeciphered flag column 1092. In the former column, "u"

and "a" stand for the utterances of the user and an agent, respectively. In the

latter column, the flag is set to one when the request is an undeciphered user

request and is set at zero otherwise.

20   [0219]   Fig. 31 illustrates an undeciphered user request list 1100 generated by

the communication unit 1022. The list 1100 comprises a user column 1102 to

record the names of users who input undeciphered user requests, a mail address column 1104, a date and time column 1106 to record when the undeciphered user request occurred, and a full sentence column 1108 to store the entire sentences of the undeciphered user requests. The system manager,

5   after checking the undeciphered user requests, may respond to the users via electronic mails.

[0220]

[0221]   In another preferred embodiment, the response controller 1016 may check the full sentence of the user's request directly against the dialog data

10   storage 1018. In this case, undeciphered user requests may be registered as a whole sentence, such as "Let me know the standard voltage in Africa," together with the suitable response for the request.

Embodiment 3

[0222]   Embodiment 3 provides a technique to offer interaction among a

15   plurality of agents, which may be displayed as animated characters, from a different technical view. According to Embodiment 3, characters which have been created entirely independently can have interaction. This embodiment also provides a technique to efficiently develop such agent functions.

[0223]   Fig. 32 shows a preferred configuration of the user support

20   system 2010 according to Embodiment 3. A user terminal 2012, a control window management site 2016, a chat server 2018 and a recipe server 2020

are all connected via the Internet 2014. The control window management site 2016, the chat server 2018 and the recipe server 2020 are servers in a broad sense of the term.

[0224]   The chat server 2018 and the recipe server 2020 are in charge of

5   specialized areas so that they interpret user dialog and process the actions of agents. The chat server 2018, for example, processes greetings, such as "Hello", whereas the recipe server 2020 processes user references concerning recipes, such as "Let me know a good recipe". By assigning specialized functions to each specialized server, the whole process can be divided and

10   distributed so that the maintenance of each agent becomes easier.

[0225]   The chat server 2018, the recipe server 2020 and the like are collectively referred to as "specialized" servers or "expert" servers; and the agents supported in the specialized servers are referred to as "expert" agents. The control window management site 2016, the chat server 2018 and the recipe

15   server 2020 may be realized in different nodes on the network. Alternately, the control window management site 2016 may be implemented in the chat server 2018, which may be designed as the originating server to handle the interaction with the user terminal 2012. The example below is described on the latter assumption.

20   [0226]   The basic process shown in Fig. 32 is as follows: The user terminal 2012 first connects to the control window management site 2016 via

the Internet 2014. The site 2016 performs a total management function to manage a plurality of agents, as well as a character management function to manage a plurality of characters simultaneously. These functions are referred to hereinafter as "horizontal functions". The horizontal functions, which are

5   characteristic of the present embodiment, work as a bridge to allow different agents to interact by having conversations. The site 2016 transmits a program to provide the horizontal functions to the user terminal 2012, which then is able to perform the horizontal functions even in an off-line environment.

[0227]   The user terminal 2012 then connects to the chat server 2018 to

10   receive a specific service. The chat server 2018 is specialized for chat and supports an agent control function to realize the chat service and a character control function to work for the same purpose. These specialized functions are referred to as "expert functions" or "specific purpose functions". The specific purpose functions are designed and implemented in each expert server. The

15   recipe server 2020 has the specific purpose functions regarding recipes. Specialized servers may be provided for a travel agent, a PC agent and various other information which users may be interested in.

[0228]   The user first talks to the chat agent to request a particular service. The chat agent acquires and interprets the user request. When the request

20   relates to a recipe, the chat agent calls the total management function to make the recipe agent appear on the screen. The total management function divides the screen of the user terminal 2012 into two frames in which the chat agent

and the recipe agent are put separately. The two agents have interaction including greetings and the like. For this purpose, the horizontal function is invoked. The interface between the horizontal function and specific functions is predefined. It becomes possible for each agent to talk to another agent as long

5   as the agent is designed on the interface. The interaction with another agent is not possible without the horizontal function. An agent should respond to another agent when a dialog is initiated. To this end, functions according to the interface must be implemented in the agent so as to take actions responsive to the total management function. The agents can be put in windows instead of

10   the frames in any of the embodiments discussed in this specification.

[0229]   Various functions so far described are embodied in the form of computer program functions. For this purpose, the main developer of the entire user support system 2010, or the leading developer, first implements the horizontal function in the control window management site 2016 as the basic

15   framework of the entire system, and informs otehr designers of expert agents or general developers of the horizontal function. The general developers will know the horizontal function which they can use and the format and content of each function. The leading developer, on the other hand, decides the content of program functions to realize specific functions of each agent so that the

20   horizontal function can issue instructions to each agent. The general functions must implement the program functions determined by the leading developer. The interface may be regarded as the program functions described above.

[0230] Fig. 33 illustrates the internal structure of the control window management site 2016 which comprises a total system manager 2022, a character manager 2024 and a user dialog processor 2026, each of which communicates with the user terminal 2012 via a communication unit 2028 and

5 the Internet 2014. The total system manager 2022 supports the horizontal function at the agent level. Similarly, the character manager 2024 supports the horizontal function at the character level. The user dialog processor 2026 displays a user input prompt on the screen of the user terminal 2012 and acquires letters entered by the user. The functions of the control window

10 management site 2016 may be downloaded to the user terminal 2012 beforehand and may work inside the user terminal 2012.

[0231] The total system manager 2022 provides a field to enable the interaction among a plurality of agents and manages the agents completely. The substance of the total system manager 2022 in this embodiment is an

15 HTML file in which program functions described in a script language include the following ones:

AddAgent(): add a new character to the field,

Bcast(): inform all displayed characters of an information item,

Tell(): inform one agent of an information item,

20 ReqUI(): request the chat agent to acquire user information,

ReqPr(): request the user input prompt to be displayed.

[0232] In these functions, attributes (such as target information and target agent) may be described. These functions are provided as standard functions, which the general developers can use when designing an agent. The total system manager 2022 also manages cookies to be set in the browser of the

5 user terminal 2012.

[0233] The character manager 2024 provides a basic function to visually present the interaction among the agents at the character level. The character manager 2024 is also an HTML file in which functions are written in a script language. Some examples of the functions are as follows:

10 WalkClose(): move to a specified character,

PointWin(): point at a specified window,

Talk(): talk to a specified character.

[0234] These functions are also provided as standard functions. To realize these functions, the character manager 2024 has a function to detect the

15 positions of all the characters.

[0235] Fig. 34 shows the internal structure of the chat server 2018. In this figure, "H", "I", "F" and "X" stand for utterance data, index search for utterance, a file name containing the URL of the page of the expert server, which should respond to a specified user utterance, and unidentified utterance, respectively.

20 **[0236]** An agent controller 2066 obtains and interprets a user request via an animated character so that the substantial function of an agent is realized. A

character controller 2068 provides a series of basic functions of a character used by the agent controller 2066. At least one combination of the agent controller 2066 and the character controller 2068 is implemented in each specialized server to conduct a specialized service. A communication unit 2030

5   enables communication between the agent controller 2066 and the character controller 2068 with the user terminal 2012 via the Internet 2014.

[0237]   The agent controller 2066 has a series of functions to respond to the utterance of the user or other agents, hereinafter referred to simply as "target utterance". A main controller 2060 controls a series of processes mainly

10   conducted by an utterance acquiring unit 2032 and the character controller 2068. The essential function of the main controller 2060 is to specify a page which corresponds to each target utterance and moves to the page. The utterance acquiring unit 2032 acquires the target utterance from the user terminal 2012 and sends it to an utterance search unit 2034. The utterance

15   search unit 2034 first conducts an index search by verifying the first letter or word of the target utterance in an index file 2036. After the index search, the utterance search unit 2034 attempts to identify the target utterance by conducting a phrase search considering the entire target utterance. In the phrase search, not only the words but also the order of the words are

20   considered. When the target utterance cannot be found by the phrase search, the utterance may be divided into words and a keyword search may be conducted.

[0238] The index file 2036 contains assumed or anticipated utterances in an alphabetic order which are stored in an assumed utterance collection 2038 to identify the target utterance. It is generally possible to conduct a fast search by referring the first letter or word to the index file 2036 even when the assumed

5   utterance collection 2038 is large. As described later in this embodiment, the assumed utterance collection 2038 is easily expanded, and the fast search realized by the index search is beneficial.

[0239] When the target utterance is identified in the index file 2036, a file containing the URL and other information corresponding to the specialized

10   server to respond to the target utterance is also identified in the index file 2036. The file stored in the assumed utterance collection 2038 is then opened and the URL is acquired. Each target utterance has one file in the assumed utterance collection 2038.

[0240] When the URL is within the chat server 2018 itself, the URL is

15   transmitted to the main controller 2060, which sends the URL to the browser of the user terminal 2012 via the communication unit 2030.

[0241] When the URL is within another specialized server, the URL is set to the browser of the user terminal 2012 and the user terminal 2012 accesses the specialized server. To be more precise, the URL points not the home page of

20   the specialized server but a specific independent page to directly respond to the

target utterance. Each utterance has at least one corresponding page in this embodiment.

[0242] It is naturally desirable that the target utterance has its complete copy in the assumed utterance collection 2038. During the improving process of the

5 assumed utterance collection 2038, however, the target utterance does not necessarily have its perfect copy in the assumed utterance collection 2038. In that case, the utterance search unit 2034 seeks the most probable utterance in the assumed utterance collection 2038, parsing the utterance into words and retrying the search by inputting logical ANDs of the individual words, especially

10 nouns. The target utterance which could not be found, or which was found only in the retry search, is recorded in an unidentified utterance file 2040 as an unidentified utterance, which is transmitted to the system manager by e-mail via the reporting unit 2042.

[0243] The system manager requests the manager of the specialized server,

15 which should have responded to the unidentified utterance, to improve the response process conducted by the expert agent. The manager of the specialized server registers the unidentified utterance and the URL of a page of the specialized server, which should correspond to the unidentified utterance, in the assumed utterance collection 2038 within the specialized server. The

20 manager of the specialized server also registers the index of the utterance in the index file 2036 and designs the process, including the action of the expert agent associated with the page. In this maintenance, an unidentified utterance

can be easily added in the assumed utterance collection 2038 and it is generally easy to improve the content of the assumed utterance collection 2038 in this manner.

[0244] The main controller 2060 also manages a personal information file 2048. The personal information file 2048 may be managed only by the chat server 2018 among a plurarity of specialized servers as the chat server 2018 frequently has conversations with the user and is suitable to acquire the personal information of the user. The main controller 2060, for example, may be implemented with a program function to periodically ask the user information, such as the age of the user and other attributes, such as the preference of foodstuffs and the like. Answers from the user may be recorded in the personal information file 2048. Other agents can request to acquire the personal information using the aforementioned program function ReqUI(). The personal information may be used when specialized servers perform services for the user. In this embodiment, the chat agent may issue an instruction instead of the user when another agent conducts a service for the user. Agents may also interact during the process.

[0245] The main controller 2060 may be implemented with the program functions below:

Respond(): is called when an animated character is clicked and describes a proper process to the click,

Listen(): acquires information when transmitted from another agent.

[0246] Implementation of these functions is entrusted to the general developer of the chat server 2018. These functions are called from the total system manager 2022, the character manager 2024 and other similar modules.

[0247] A character controller 2068 comprises an action file 2062 to describe
5 the actions of an animated character to respond to each target utterance, and character data storage 2064 to store the image data and voice data of the character. The character data 2064 is first downloaded to the user terminal 2012 and can work within the user terminal 2012.

[0248] The character controller 2068 is, for example, implemented with the
10 program functions listed below:

ComeOut(): makes characters appear on the screen,

Act(): makes a character play a designated action,

Spk(): displays a designated text in a window and outputs voice data according to the text,

15 GoOut(): makes a character disappear on the screen,

Halt(): freezes all the characters.

[0249] The basic action of a character is controlled with the above functions. The development of these functions is also entrusted to the general developers. These functions are also called from the total system manager 2022 and the
20 character manager 2024.

[0250] An access recorder 2044 records the access history of each user to

the specialized servers in an access information file 2046. By this configuration,

a response to the same user utterance may be made different for each user.

For example, when a user first visits the chat server 2018 and says "Hello", the

5   chat agent answers "Hello. Nice to meet you". When the user revisits the chat

server 2018, the chat agent may answer "Hello, how are you getting along?" to

act more properly according to the situation. The access recorder 2044 informs

the utterance search unit 2034 of the access history of the user. The utterance

search unit 2034 selects a page suitable for the present situation and sends the

10   URL to the browser of the user terminal 2012 if a plurality of pages of a

specialized server are found to respond to the target utterance in the assumed

utterance collection 2038, just like the above example.

[0251] Fig. 35 shows the internal structure of the index file 2036. Fig. 36

shows the internal structure of the assumed utterance collection 2038. The

15   index file 2036 comprises an alphabetic column 2100, a target utterance

column 2102 and a file name column 2104. The target utterances are sorted in

alphabetical order by the first letter of the utterance.

[0252] The assumed utterance collection 2038 comprises a file name

column 2104, a target utterance column 2102 and a page column 2120 to

20   indicate the page from the specialized server to respond to the target utterance.

For example, when the user utterance is "Hi", the page of the specialized server

is "URLa43". The combination of "Hi" and "URLa43" composes the file f044.

The target utterances are classified to each specialized server. A user
utterance collection 2110 which the chat server 2018 should manage and a
user utterance collection 2112 which the recipe server 2020 should manage, for
example, are generated independently. The index file 2036 and the assumed

5   utterance collection 2038 are linked together with file names. "Hello"
corresponds to the file f045 in the index file 2036, which in turn corresponds to
the file f045 of the assumed utterance collection 2038.

[0253]   As shown in the index file 2036 of Fig. 36, "Hello" has two
corresponding pages URLa1 and URLa2. The URLa1 is sent to users who first

10   visit the chat server 2018, and URLa2 is sent to users who revisit the chat
server 2018.

[0254]   Fig. 37 shows the access information file 2046. "User 1" has visited
"chat", "recipe" and "auction" servers. "User 2" has visited "travel" and "PC"
servers. In this situation, when user 2 visits the chat server 2018, the chat

15   agent selects an utterance for an initial visitor, and when user 1 visits the chat
server 2018, the chat agent selects an utterance for a repeat visitor.

[0255]   Fig. 38 shows the internal structure of the action file 2062. The URL
specified in the utterance search unit 2034, such as the URLa1 or URLa2 in
case of "Hello" shown in Fig. 36, is input to the action file 2062 via the main

20   controller 2060. In the action file 2062, each URL specified by the utterance
search unit 2034 corresponds to each page, for example, URLa1 to page 70,

URLa2 to page 72 and URLan to page 74, so that multiple pages are bundled. Each page is a Web page and is provided for each target utterance to achieve system flexibility.

[0256]   An example of the content of a page contained in the action file 2062

5   is now described. The name of the page is "AC.html" and has a function to load and display a standard animated character provided by a certain operating system under the name of "AChara". The character speaks when the function Spk is called externally.

```
<html>
```

10 ```
<head>
```

```
<title>TEST</title>
```

```
<meta http-equiv="Content-Type" content="text/html; charset=Shift_JIS">
```

```
</head>
```

```
<body bgcolor="#FFFFFF">
```

15 ```
<!--declaration and load of Agent of company x-->
```

```
<OBJECT ID="AgentControl" CLASSID="xxx" CODEBASE="#VERSION=
```

```
2,0,0,0">
```

```
</OBJECT>
```

```
<SCRIPT language=Javascript>
```

20 ```
var AChara;
```

```
Agent.Characters.Load("AChara","C:¥¥XXX¥¥Xagent¥¥CHARS¥¥AChara.acs")
```

```
;
```

```
AChara=Agent.Characters.Character("AChara");
```

```
AChara.ComeOut();

</SCRIPT>

<SCRIPT language=Javascript SRC="AC.js"></SCRIPT>

</body>
```
5   `</html>`

[0257]   A script file is used. The character speaks using the function, which collectively stands for HTML files and functions written in script languages. The script file is as follows:

```
function SPK(spText) {
```
10   `AChara.Speach(spText);`

`}`

[0258]   When the name of a frame in which AC.html is displayed is "aFrame", it becomes possible to make AChara speak from outside by writing as follows:

`aFrame.Spk("Good-bye");`

15   [0259]   Fig. 39 illustrates the internal blocks of the user terminal 2012. Each function of the user terminal 2012 may be provided from the control window management site 2016, the chat server 2018, the recipe server 2020 or other expert servers. The functions may also be pre-installed in the user terminal 2012 or may be downloaded from the control window management

20   site 2016 when the user terminal 2012 is first connected to the site 2016 and is held locally. In other words, when the user support system 2010 is realized with

the user terminal 2012, the control window management site 2016 and other

servers each function for processing may be installed in the client or in the

server or in any other locations. As a general rule, functions which should be

less frequently updated, or which need no updating, may be pre-installed in the

5   client.

[0260]   A communication unit 2114 communicates with the control window

management site 2016 and other servers via the Internet 2014. A control

window 2080 comprises a first processor 2082, a second processor 2084 and a

user dialog processor 2086. The first processor 2082 comprises a total system

10   manager 2090, which manages a chat agent controller 2092 and a recipe agent

controller 2094. The total system manager 2090, the chat agent controller 2092

and the recipe agent controller 2094 correspond to the total system manager

2022 of the control window management site 2016, the agent controller 2066 of

the chat server 2018 and an agent controller (not shown) of the recipe server

15   2020, respectively. The chat agent controller 2092 and the recipe agent

controller 2094 manage a chat region generator 2106 and a recipe region

generator 2108, respectively, to display the result of services. The second

processor 2084 comprises a character manager 2096, which manages a chat

character controller 2098 and a recipe character controller 2116. The character

20   manager 2096, the chat character controller 2098 and the recipe character

controller 2116 correspond to the character manager 2024 of the control

window management site 2016, the character controller 2068 of the chat server

2018 and a character controller (not shown) of the recipe server 2020,

respectively. The user dialog processor 2086 corresponds to the user dialog processor 2026 of the control window management site 2016. The first processor 2082 and the second processor 2084 refer to the information inputted in the user dialog processor 2086.

5   **[0261]**   The above functions, which have been described with regard to Figs. 33 and 34, can be viewed by the user when in operation. The chat region generator 2106 and the recipe region generator 2108 display information to the user and accept instructions and other operations from the user. The second processor 2084 provides information in a visible or audible manner and accepts

10   user operations such as clicks. The user dialog processor 2086 displays a user input prompt and accepts text input.

[0262]   The interaction between the user and agents and among agents will now be described. Fig. 40 illustrates a screen 2150 displayed when the user initiates the user terminal 2012. A character 2156 of the chat agent, hereinafter referred to as "Chat Agent" 2156, appears and says, for example, "Hello! I am

15   Chat Agent Pea-ko". The user inputs a query of the Chat Agent 2156, such as "Let me know a recipe" in an input region 2154 and clicks a SEND button. The input area 2154 may appear when the user clicks Chat Agent 2156. Chat Agent 2156 may talk to itself or ask a question of the user to encourage the user

20   request until the user clicks it.

[0263] Input text is acquired by the user dialog processor 2086 and is analyzed by the chat agent controller 2092. The chat agent controller 2092 has inside a copy of the function of the agent controller 2066 in the chat server 2018 and specifies a page in the action file 2062 of the character controller 2068 to

5 respond to the user. The page may be identified in the action file 2062 of the character controller 2068 or in the chat character controller 2098 of the user terminal 2012. In this example, the target utterance relates to recipe and a process "Call a recipe agent on the screen" is described in the specified page for the response. More concretely, a program function ADDAgent() prepared by

10 the total system manager 2022 is written in the HTML file beforehand. That is, a horizontal function at the agent level is used to bridge different agents when the process executed by an agent relates to another agent.

[0264] Fig. 41 shows a screen 2150 appearing after the above process. The total system manager 2090 divides the screen 2150 into a first frame 2150a and

15 a second frame 2150b. Chat Agent 2156 is placed in the former and Recipe Agent 2160 is placed in the latter. Before Recipe Agent 2160 is called, Chat Agent 2156 will indicate this by telling the user "Now, let's call Recipe Agent ...". Recipe Agent 2160 on the other hand asks "I am Recipe Agent. What is your preference?" to the user when it is called. The utterance of Chat

20 Agent 2160 is realized by the recipe agent controller 2094 and the recipe character controller 2116 using a program function such as Spk() to make a character speak written in a page (not shown) to respond to the user. The user then inputs "Chinese" in the input region 2154 and sends it to the server.

[0265] Continuing the example, Fig. 42 shows the screen 2150 after the above process. Chat Agent 2156 interprets that the utterance of Recipe Agent 2160 relates to the introduction of a dish. The chat character controller 2098 specifies a page to respond to the utterance. In the page, the

5 note "Advise the agent presently speaking not to recommend hot dishes" is described. Chat Agent 2156 comes closer to Recipe Agent 2160 and relates "Do not teach very hot ones" as a request. For this purpose, the aforementioned WalkClose()and Talk() are written in the page of Chat Agent 2156. Recipe Agent 2160 on the other hand accepts the advice as the

10 utterance of another agent, interprets the utterance and specifies a page to respond. In the page, for example, the note "Obey the request. Search for a recipe without chili sauce" may be written. In this case also, the function Talk() is used to make Recipe Agent 2160 and Chat Agent 2156 face each other on the screen. In the background process, the chat agent controller 2092 executes

15 a search using a search condition or a formula, such as

("recipe" OR "menu") AND "Chinese" AND "recommendation" AND /"chili sauce",

where "/" is a NOT operator. The preference of the user has been recorded beforehand in the personal information file 2048.

20 [0266] Fig. 43 shows the screen 2150 containing the search result obtained by Recipe Agent 2160. Recipe Agent 2160 says "Today's recommendation". The search result is displayed in a recipe window 2166 generated by the recipe region generator 2108. The search result is displayed with titles which are

linked to details. Sites containing Chinese recipes found by the search are displayed in a search result area 2172 by the recipe agent controller 2094 for the reference. Chat Agent appears to be asleep as it has not been talked to. Pages may be designed to respond not only to the content of the target

5   utterance but also to the interval or other states of thediscussions with the user and other agents.

[0267]   In Fig. 43, the user further inputs a question "Tell me good places for autumn hiking". Fig. 44 shows the screen 2150 appearing after the question is input. In the screen, a third frame 2150c is created and a Travel Agent 2170

10   appears in the frame. Chat Agent 2156 talks to Travel Agent 2170 saying, for example, "Hello. Long time no see you." and Travel Agent 2170 answers "Hi". The interaction between different agents here is also controlled by the aforementioned program functions or the like.

[0268]   The effect of the present embodiment is as follows:

15   **[0269]**   Different agents provided from different companies or creators can have interaction by standardizing the interface at a program function level. Agents which have completely different output formats, such as a 3-D polygonal character written in VRML (Virtual Reality Modeling Language), a 2-D character in JPEG (Joint Photographic Expert Group) or an arbitrary bit map character the

20   user created with a digital camera, can have conversations on the same screen and thereby can provide an interesting and entertaining agent apparatus.

[0270] By adopting a standardized interface, the leading developer can effectively collaborate with general developers or with third parties. The leading developer develops the control window management site 2016 and the general developers develop expert agents. The number of expert agents can be

5 increased relatively easily in accordance with the user request by designing each agent in a modular manner.

[0271] A few modifications are now described. The user terminal 2012 may be pre-installed with a plurality of expert agents which are frequently used. The user terminal 2012 may download such agents beforehand. In that case, if an

10 agent which should be called after the interpretation of the utterance by Chat Agent 2156 exists inside the user terminal 2012 from the beginning, the process performed by Chat Agent 2156 is made unnecessary, and the expert agent may appear immediately on the screen 2150 without the help of Chat Agent 2156. Such expert agents may be hidden in the user terminal 2012 even when they

15 exist therein.

[0272] The control window 2080 may be a conceptual framework provided by the control window management site 2016. In actual implementation, however, the control window 2080 may be provided visibly or invisibly, linked with an arbitrary object or a region on the screen 2150. The control window 2080 may

20 be set on the entire screen 2150 in an invisible manner so that Chat Agent 2156 appears when the user clicks on an arbitrary portion of the screen 2150.

[0273]   The target utterance may be acquired via voice recognition hardware and software. Users may feel it more natural to input their request via voice.

[0274]   An unidentified utterance is described as an utterance which could not be specified in the assumed utterance collection 2038. The unidentified utterance, however, may be one which could be specified in the assumed utterance collection 2038 but to which the expert agent could not properly respond. For example, when the target utterance is "Let me know a recipe", the search result may contain too many information items. In this case, the user would not be able to find desired information. Such a target utterance may be sent to an expert agent manager so that the expert agent is improved.

[0275]   Utterance from an expert agent may be selected based on the access history of the user to each expert server. The utterance may be further selected based on the attribute information of the user. The expert agent may select a more gentle expression when the user is a female. The agent may select a more formal or polite expression when the user is relatively elderly.

[0276]   It is not always necessary for expert agents to interpret the user utterance using the full sentence search. A "beef" expert agent may be designed such that it always responds to the word "beef" or "meat" regardless of the whole sentence. Each expert agent may be implemented with a different method for interpreting the user utterance. A single expert agent may have more than one method to interpret the user utterance.

[0277] The character manager 2096 of the second processor 2084 may be combined with the total system manager 2090 of the first processor 2082. There may be various modifications to achieve the same functions. Combining or dividing the functional blocks depends on the design guide and the actual

5   desired operation.

[0278] An action of a character such as "Speak" was described to be sent from a server to each character controller. The action, however, may be received by each agent controller, which sends it to each character controller via the total system manager 2090. In this method, the total system

10   manager 2090 can detect all the situations occurring in the system. The total system manager 2090 can more easily control an action of a character to "Speak" to all the other characters and make a character recognize the action of another character as the total system manager 2090 knows the frame names in which each character controller resides, the number of expert agents or

15   characters and the positions of the characters.

Embodiment 4

[0279] If a user wants to revisit a specific Web site in the future, he/she usually puts a bookmark on the URL of the Web site. The number of bookmarks thus stored is easily increased as the user browses Web sites.

20   According to Embodiment 4, agents or characters help the user find a desired Web site easily.

[0280]   Fig. 45 shows the entire configuration of a network system 3010 including a user support system 3016 according to Embodiment 4. A user terminal 3012 and a user support system 3016 are connected via the Internet 3014.

5   **[0281]**   The user support system 3016 comprises an originating server 3020, a chat server 3024 and a gourmet server 3026, which are connected to the Internet 3014. The originating server 3020 comprises an electronic user utterance collection created by anticipating or assuming user utterances and an utterance identification block to specify the user utterance when it is inputted.

10   The user utterance identification block is commonly referred to by other servers in the system, for example, the chat server 3024 and the gourmet server 3026. The chat server 3024 and the gourmet server 3026 comprise an electronic agent action collection created by assuming the actions of an agent to respond to a user utterance and a response block to make the agent respond to the user

15   utterance, respectively. The servers have the response blocks independently within their nodes.

[0282]   The originating server 3020, the chat server 3024 and the gourmet server 3026 are preferably located on different network nodes so that the process to specify a user utterance and the process to make an agent respond

20   to the utterance can be conducted simultaneously on different nodes. Agents can be made onto different nodes and the maintenance for each agent becomes easier. The system 3016 may be composed as a single unit to be

implemented in a portal site. The servers, however, are included on different nodes. The originating server 3020 behaves as a portal server for the user terminal 3012 that access the system.

[0283]   A user utterance is first transmitted to the originating server 3020, which characterizes the utterance referring to the user utterance collection. An agent which should respond to the utterance is determined and the response block executes a process for the character's response. For example, an agent in the chat server 3024 may respond to general greetings, such as "Hello". An agent in the gourmet server 3026 may respond to meals, foodstuffs and so on. Each expert agent operates to find information needed for the user out of a huge amount of information by obtaining the needs of the user specified during the conversation with the user.

[0284]   According to the present embodiment, when the user puts a bookmark on a Web site he/she likes, the bookmark information is automatically classified into one of the folders prepared for specialized areas. For example, when the user puts a bookmark on a Web site searched and presented to the user by the gourmet agent, the URL of the site is stored in a folder related to gourmet or a gourmet folder. The bookmark information is presented or displayed to the user in the manner that it is classified in each folder.

[0285]   The process shown in Fig. 45 is summarized as follows: A local agent implemented within the user terminal 3012 appears when the user initiates the

user terminal 3012. The local agent waits for the first or initial utterance of the user. The initial utterance is sent to the originating server 3020 via the Internet 3014. The Web browser in the user terminal 3012 displays a page from the originating server 3020.

5 **[0286]** The originating server 3020 is installed with a user utterance collection which holds expected user utterances. The initial utterance is searched in the user utterance collection so as to be identified. An expert agent corresponding to the subject of the user's initial utterance is specified and the URL of the specified specialized server, which is shown as "URLa/URLb" in Fig. 45, is sent

10 to the browser of the user terminal 3012. The user terminal 3012 displays the image corresponding to the page from the specialized server. The expert agent appears on the screen. Each specialized server includes an agent action collection for the respective expert agents and responds to the initial utterance and further utterance of the user, hereinafter referred to as a general utterance.

15 The action of an agent is exemplified with an utterance hereinafter. The action, however, may include a gesture and other behavior, colors in the screen image, a change in texture, the search operation of the agent and other program processes responding to the user.

[0287] When the user gives a new utterance or a general utterance to the

20 expert agent, the utterance is sent to the originating server 3020. The originating server 3020 again specifies an expert agent corresponding to the utterance and sends the URL of the specialized server to the user terminal

3012. The series of steps below is preferably repeated:

1. specify the user utterance by the originating server 3020;

2. specify a specialized server to process the specified utterance;

3. respond to the user by the expert agent implemented in the specialized

5   server;

4. encourage the user to input a new utterance.

[0288]   In each cycle of the above process, the initial step is always

conducted by the originating server 3020.

[0289]   In the above process, the expert agent, by searching over the Internet,

10   presents the information requested by the user. When the user requests to

register a bookmark of the Web site containing the presented information, a

bookmark register provided in the originating server 3020 stores the URL of the

Web site in a folder corresponding to the specialized area of the agent.

[0290]   Fig. 46 shows the internal structure of the originating server 3020.

15   The differences between Fig. 46 and Fig. 34, which shows the internal structure

of chat server 2018, is now described.

[0291]   The bookmark register 3050 stores in a bookmark file 3054 the URL of

the Web site upon request of the user. The bookmark information is classified

and stored in one of the folders which are provided for in the specialized area.

20   A bookmark display unit 3052 displays the bookmark information stored in the

bookmark file 3054 classified in the folders.

[0292]   An index file 3036 is shown in Fig. 35 in Embodiment 3. A user

utterance collection 3038 shown in Fig. 47 is similar to the one shown in Fig. 36

in Embodiment 3. In Fig. 47, however, files f267 and f306 relate to a restaurant

or gourmet.

5   **[0293]**   Fig. 48 illustrates the internal description of an access information

file 3046. The access information file 3046 is similar to the one shown in

Fig. 37. In Fig. 48, however, "recipe" is replaced by "gourmet".

[0294]   Fig. 49 shows the internal structure of the bookmark file 3054. The

bookmark information registered by "user1" is classified and stored in "gourmet

10   folder", "chat folder" and so on. Each folder stores a plurality of bookmarks.

"Gourmet folder", for example, stores the URL "http://OO.com" of the Web site

"Chinese restaurant B" as bookmark 1 information and the URL "http://XX.com"

of the Web site "restaurant C" as bookmark 2 information.

[0295]   Fig. 50 shows the internal structure of the gourmet server 3026 as an

15   example of specialized servers. A communication unit 3060 communicates with

the user terminal 3012, the originating server 3020 and the like via the Internet

3014. The URL specified by the utterance search unit 3034 of the originating

server 3020 is input to an agent action library 3062 via the communication unit

3060. The agent action library 3062 includes agent data 3072 which describes

20   the expert agent utterance, image and behavior. Each URL specified by the

utterance search unit 3034 has a page corresponding thereto.

[0296] In Fig. 50, the page 64 corresponding to the URLa1 is illustrated. The page 64 includes an agent output unit 3070, a user utterance acquiring unit 3074 and a specific process execution unit 3076. The agent output unit 3070 responds to the user utterance with the gourmet agent based on the

5 agent data 3072. The specific process execution unit 3076 conducts processes other than responses by agents. The specific process or purpose execution unit 3076 may execute various programs to support other functions of the system. A search unit 3078 searches information requested by the user via the Internet 3014. For example, the utterance which leads the user to the page

10 "Teach me good restaurants in New York", results in the gourmet agent searching for restaurant information via the Internet 3014 and presenting the information to the user. The user utterance acquiring unit 3074 acquires general utterances of the user and transmits them to the originating server 3020, which specifies a specialized server again.

15 **[0297]** Fig. 51 shows the internal structure of the user terminal 3012. A communication unit 3130 communicates with the originating server 3020, the chat server 3024, the gourmet server 3026 and other specialized servers via the Internet 3014. The user interface (UI) 3138 may be a keyboard, a mouse, a display apparatus or other various data interface formats. A local agent output

20 unit 3132 provides local agent data 3134 to the user via the UI 3138. The initial utterance and general utterances of the user are acquired by a user utterance input unit 3136 via the UI 3138. The acquired utterance is sent to the originating server 3020 via the communication unit 3130 and the Internet 3014.

[0298] Fig. 52 illustrates a preferred screen 3150 display when the user terminal 3012 is initiated. A local agent 3152 appears and says "Welcome! Let's chat". The user inputs "Hello" in an input area 3154 and sends it. The input "Hello" is sent to the originating server 3020 as the initial utterance, from which the chat server 3024 as a specialized server is specified. The user terminal 3012 accesses a page in the chat server 3024.

[0299] Fig. 53 illustrates the screen 3150 displayed after the above process. A Chat Agent 3156 is displayed. In the present embodiment, the local agent 3152 is the same as Chat Agent 3156 by appearance so that a seamless conversation continues. A bookmark button 3190 is displayed by the bookmark file 3054 on the screen. When the user pushes the bookmark button 3190, the bookmark information stored is displayed with the folders. The Chat Agent 3156 says "Hello! I am Chat Agent Pea-ko...". The user may, for example, input in the input area 3154 "Let me know a restaurant·serving good Peking ravioli". The utterance is acquired by the originating server 3020 which identifies a page in the gourmet server 3026. The URL of the identified page is sent to the user terminal 3012, which accesses to the page.

[0300] Fig. 54 illustrates a screen 3150 that is preferably displayed after the above process. The Gourmet Agent 3160 appears and says "All right! Trust me. I am Gourmet Agent." The search unit 3078 searches through the Web pages using a keyword "Peking ravioli". The agent says "Wait for a moment. I will come back soon." in order to let the user know the search process is in

progress. When the search is finished, a page to show the search result is displayed on the user's terminal.

[0301] Fig. 55 illustrates the screen 3150 displaying the page for the search result. The titles 3170 of the Web pages obtained by the search unit 3078 are

5 displayed on the search result page. Each title 3170 is linked to the Web page so that the user can easily access a page by clicking the link. When the user clicks a register button 3180, the corresponding URL of the Web site is stored in the gourmet or other appropriate folder contained in the bookmark file 3054.

[0302] Fig. 56 illustrates the screen 3150 displaying the registered bookmark

10 information. When the user clicks a bookmark button 3190, a folder list 3192 is displayed by the bookmark display unit 3052. When the user puts a cursor on the gourmet folder, the titles 3194 of the Web sites stored in the gourmet folder appear. The user can access to the URL of the Web site when the user clicks a title.

15 **[0303]** Various modifications of the present embodiment are discussed below.

[0304] In the present embodiment, the utterance identification block is installed in the originating server 3020 and is commonly used by a plurality of servers. Each specialized server, however, may have its own independent

20 utterance identification block and response block. In this configuration, each server can manage its own user utterance collection and agent action collection

so that the management and maintenance of the agent becomes easier within the server. A core server to process all the utterances may be provided even in this configuration.

[0305]   In the present embodiment, the images of the local agent 3152 and

5   Chat Agent 3156 are made identical. Naturally, it is not necessary to match them. The local agent 3152 may not be installed in the user terminal 3012. Instead, an "opening agent" or the like which appears when the user terminal 3012 is initiated may be implemented in the originating server 3020.

[0306]   In the present embodiment, the bookmark register 3050, the bookmark

10   display unit 3052 and the bookmark file 3054 are provided in the originating server 3020. These units may be implemented in other specialized servers or in the user terminal 3012.

[0307]   In the present embodiment, each folder in the bookmark file 3054 corresponds to each specialized area of a specialized server. Naturally, folders

15   may be classified on a selected criterion. For example, the system may request the user to designate a plurality of folders and to suggest which folder to be associated with which kind of Web sites. When a Web site is requested by the user to be registered, the type of the Web site may be analyzed referring to the user utterance collection to specify a specialized area. A bookmark is then put

20   on the Web site and is stored in the folder associated with the specified

specialized area. According to this method, the bookmark information already stored in the user terminal 3012 may be reclassified.

[0308] The folders in the bookmark file 3054 may be prepared beforehand or may be generated or modified by adding new folders requested by the user or any expert agents. The bookmark information may be classified when it is stored upon request from the user or may be classified later as mentioned. As long as the bookmark information can be classified and stored to help the user revisit the Web site he/she likes, many modifications for creating folders are available.

Embodiment 5

[0309] The whole network system including a user support system according to Embodiment 5 is the same as Fig. 45 of Embodiment 4.

[0310] The user support system according to Embodiment 5 requests the user to register the items of information he/she is interested in and therefore searches frequently. By requesting this registration, the search process can be immediately initiated when the user utterance relates to the information items. In this system, the search is also conducted even without the user utterance so that the search result can be presented immediately. User utterances used as triggers to start the search or to display the search results are predefined to present the information to the user in a timely manner.

[0311]   An animated character imitating a human or an animal is used to present the information to the user in such a manner that the character seems to perform the search spontaneously. By employing the character, even beginner users of PCs can feel relaxed when using the system. Each character

5   corresponds to a specialized area of information, and the user can easily understand to which area the information now being processed belongs by watching the characters. Characters which are in charge of the areas the user is interested in, and in which the user conducts frequent searches, often appear to chat with the user. The user is able to directly interact with the characters.

10   [0312]   Such characters may be registered as favorite characters of the user so that the user can call them instantly. Favorite characters are so configured that the user can register the URLs of Web sites he/she likes in areas related to the characters, which present renewal information of the Web sites to the user. Each character stores the URLs of the Web sites which fall within the

15   specialized area the character is associated with. In this configuration, bookmarks can be classified according to specialized areas as the characters virtually work as folders for the bookmarks. The user does not need to confirm whether information is updated or not in the Web sites as the character informs the user of the situation. The character may report the situation periodically,

20   spontaneously or when the user utterance relates to the Web sites.

[0313]   The favorite characters may be treated similar to virtual pets by the user. A character house may be displayed on the screen in which the

characters live. The attributes of the characters may change based on the

attitude or behavior of the user on the characters. The characters may behave

differently according to the attributes. The attributes may include "cheer", which

becomes larger when the user handles the character gently and becomes

5   smaller when the user mishandles the character. A character with a large cheer

attribute may frequently conduct the search, whereas a character with a small

cheer attribute may stop working until the attribute is increased. Such design of

characters provides amusement and entertainment to the user.

[0314]   The major process flow of Embodiment 5 is similar to Embodiment 4

10   with the differences being described as follows: The user utterance collection

includes an additional utterance collection which contains expected utterances

to trigger a search by expert agents.

[0315]   When the initial utterance of the user is detected in the additional

utterance collection, the process jumps to a page to conduct a search and

15   displays the search result. In the page, a process flow is written such that the

search is performed based on the data the user registered beforehand and that

the search result is presented to the user via an animated character. In another

example, the situation whether the registered Web site is updated or not is

presented to the user via the character. In these examples, the process itself

20   jumps to the page for the search. Alternately, an instruction to start search is

sent to an expert agent so that the search process is performed as a

background process. When the background process is performed, the conversation between the character and the user may be continued.

[0316] With regard to general utterances which follow the initial utterance, the process is similar to Embodiment 4. A series of processes, however, is slightly

5   different as follows:

1. specify the user utterance by the originating server 4020;

2. specify a specialized server to process the specified utterance;

3. respond to the user by the expert agent implemented in the specialized server;

10   4. perform information search and display the search result;

5. encourage the user to input a new utterance.

[0317] Fig. 57 shows the internal structure of the originating server 4020. Now the differences from the originating server shown in Fig. 46 are described.

[0318] Each utterance has one corresponding file within the user utterance

15   collection 4038. The URL of a page to respond to the user utterance is described in each file. The content of the additional user utterance collection 4039 is included in the user utterance collection 4038 although they are separately shown in Fig. 57 for the convenience of understanding.

[0319] The URL detected in the user utterance collection 4038 or in the

20   additional user utterance collection 4039 is transmitted to the browser of the

user terminal 4012 via the communication unit 4030. The browser then connects to the designated specialized server containing the page.

[0320]   The internal structure of the index file 4036 is similar to the index file shown in Fig. 35. The internal structure of the user utterance collection 4038 is

5   similar to that shown in Fig. 47. The internal description of the access information file 4046 is similar to that shown in Fig. 48.

[0321]   Figs. 58 and 59 show the internal structure of an additional index file 4037 and the additional user utterance collection 4039, respectively. These components are included in the index file 4036 and the user utterance

10   collection 4038, respectively, but they are shown as independent components. The additional index file 4037 comprises an alphabet column 4200, a user utterance column 4202 and a file name column 4204. User utterance is sorted in alphabetic order.

[0322]   The additional user utterance collection 4039 comprises a file name

15   column 4204, a user utterance column 4202 and a page column 4220 to indicate a specialized server to respond to the user. In this example, when the user utterance is "renewal", the page of the responsible specialized server is "URLa203" and the combination of "renewal" and "URLa203" composes the file f804. The additional index file 4037 and the additional user utterance

20   collection 4039 are linked through file names. For example, the utterance "new arrival" is contained in the file f805 in the additional index file 4037, as shown in

Fig. 58, which is in turn associated with the file f805 in the additional user utterance collection 4039, as shown in Fig. 59.

[0323]　Fig. 60 shows the internal structure of the gourmet server 4026. Now only the difference from Fig. 50 is described.

5　[0324]　The specific-purpose processor 4076 in the page 64 of URLa1 performs information search in addition to the functions performed by its counterpart in Fig. 50.

[0325]　A favorite register 4080 registers the gourmet agent, or any other desired agent, as a favorite data 4082 upon request from the user. The favorite

10　register 4080 also registers the content of information the user wishes to search, and the URLs of the Web sites, as favorite data 4082 upon request. A character manager 4084 manages the attributes of the displayed characters and changes the values in accordance with the treatment of the characters by the user. The attributes are also stored as favorite data 4082.

15　[0326]　Fig. 61 shows the internal structure of the database storing the favorite data 4082. The favorite data 4082 is partitioned into a user name column 4300, a search object column 4302, a character attribute column 4304 and bookmark columns 4312, 4318. The search object column 4302 stores the content of information the user wishes to search for. The character attribute column 4304

20　comprises an age column 4306, a cheer column 4308 and an intelligence column 4310, which are managed by the character manager 4084. These

attributes are referenced when the characters are displayed on the screen of the display device. The bookmark columns store the bookmarks user select for particular Web sites. Each bookmark column contains a URL column 4314 and a last view column 4316 which indicates when the user made the last view on

5 the URL.

[0327] Fig. 62 shows the structure of a page stored in the agent action library 4062. The page is used for information searches. A specific-purpose processor 4076 of the URLa2 page 66 contains an information search unit 4077 to search for information requested by the user via the Internet 4014 and a

10 spontaneous search unit 4078 to start the search process spontaneously. The information search unit 4077 and the spontaneous search unit 4078 acquire URL information and the content object stored in the favorite data 4082 when the search is initiated. The spontaneous search unit 4078 decides the search frequency referring to the attributes of a character stored in the favorite

15 data 4082. The search result is presented to the user in the form of a display character utterance by a character displaying unit 4071 in an agent output unit 4070.

[0328] The internal structure of the 4012 is similar to that shown in Fig. 51. The initial screen of the 4012 is similar to that shown in Fig. 52. The process

20 shown in Figs. 53 and 54 is also performed in this embodiment. In the process, it is assumed that the user inputs "Teach me a good restaurant famous for Peking ravioli". The gourmet agent responds to the request and conducts the

search. When the search is finished, the process jumps to a page to display the search result.

[0329] Fig. 63 shows the screen 4150 displayed based on the page from the above example. On the screen, the titles 4170 of the Web pages acquired by the information search unit 4077 are displayed. The favorite register 4080 registers the gourmet agent as a favorite character when the user clicks a register button 4180.

[0330] Fig. 64 shows the screen 4150 in which the favorite register 4080 accepts the registration of a bookmark from the user. A bookmark is registered in the favorite data 4082 when the user fills the URL of a selected Web site in a URL column 4192 and clicks a register button 4190. A bookmark may be registered when the user clicks a bookmark register button (not shown) while viewing the Web site.

[0331] Fig. 65 shows the screen 4150 in which a favorite character registered by the user is displayed. A character house 4194 in which the favorite character lives is displayed. A search process is initiated when the user inputs "Do you have any arrivals?" as the user utterance is contained in the additional utterance collection.

[0332] Fig. 66 shows the screen in which Gourmet Agent 4160 presents the search result. Gourmet Agent 4160 tells that two sites among those the user have registered have been renewed. The last view column 4316 in Fig. 61 is

referred to in order to select sites which were renewed after the last view. Whether the registered Web sites have been renewed or not may be checked when the user utterance relates to at least one of the Web sites. Alternately, the registered Web sites may be monitored periodically and renewed sites may

5   be informed to the user when a user utterance is made.

[0333]   In the present embodiment, the favorite register 4080, the favorite data 4082 and the character manager 4084 are implemented in a specialized server. These units, however, may be implemented in the originating server 4020 to be centrally managed thereby. The favorite data 4082 may be

10   stored in the user terminal 4012. In this case, favorite characters may be designed as local agents to serve for the user in the user terminal 4012.

[0334]   Although the present invention has been described by way of exemplary embodiments, it should be understood that many changes and substitutions may be made by those skilled in the art without departing from the

15   spirit and the scope of the present invention which is defined only by the appended claims.